THE IRON AGE

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Republic Company's By-Product Coke Plant

Cooling Wharf for Receiving the Quenched Coke a Feature of the Youngstown Installation—The Coal and Coke Handling Equipment

The Republic Iron & Steel Company recently completed and put in operation in Youngstown, Ohio, a Koppers by-product coke plant. It was built to provide additional coke needed for its three blast furnaces at Haselton, Ohio, over what is made in the company's bee-hive coke ovens in the Connellsville region. The plant comprises one battery of 68 ovens, each having a capacity of 13¼ net tons of coal, with a total yield for the battery of approximately 930 tons of blast furnace coke every 24 hr. The by-products at present produced are tar and ammonium sulphate, both of which are disposed of in crude state, and the surplus gas is piped to the mills of the company and used in boilers, soaking pits and various heating furnaces. Provision has been made for further extension, so that the ultimate capacity will be sufficient to provide all the coke needed for the Haselton furnaces.

The accompanying general map shows the lay-out of the plant. It is located east of and adjacent to the open-hearth steel works of the Republic Company, and has direct connection over the company's tracks with its Haselton furnaces. A detailed description of the ovens is unnecessary, as a similar plant installed by the H. Koppers Company for the Maryland Steel Company at Sparrows Point, Md., was printed in *The Iron Age* November 19. Instead the present account will be confined mainly to a description of the coal and coke handling plants.

Coke from the Quenching Car Is Dumped on this Cooling Wharf from Which It Is Removed in Sections to the Coke Crusher Beyond

THE COAL HANDLING EQUIPMENT

The coal is delivered to the plant by rail. As in-

dicated by reference to the accompanying plan, it will be noted that the coal cars pass over a double track hopper, with the tracks being at such a grade that the loaded cars are delivered and the empty cars removed entirely by gravity. A feeder under the hopper discharges the coal evenly to a short belt conveyor, which conveys the coal under the tracks to a belt parallel to the axis of the plant. This delivers into a 150-ton coal bin in the breaker building. The bin is intended to supply the breaker in periods when coal cars are being shifted and no coal is being received at the track hoppers.

An automatic feeder of the adjustable type at the bottom of the 150-ton bin feeds the coal uniformly to a Bradford breaker. The breaker has screen plates of 12-ft. effective diameter and 14 ft. long, with 1½-in. diameter perforations and a capacity of 200 tons of run-of-mine coal per hour. The refuse and hard lumps are discharged from one end of the breaker to an 18-in. belt, which is placed at right angles to the general axis of the plant and discharges into a car standing on the refuse track. The coal crushed in the breaker is discharged into a hopper underneath and thence another conveyor which elevates it to either one of the two hammer mills in the hammer mill building.

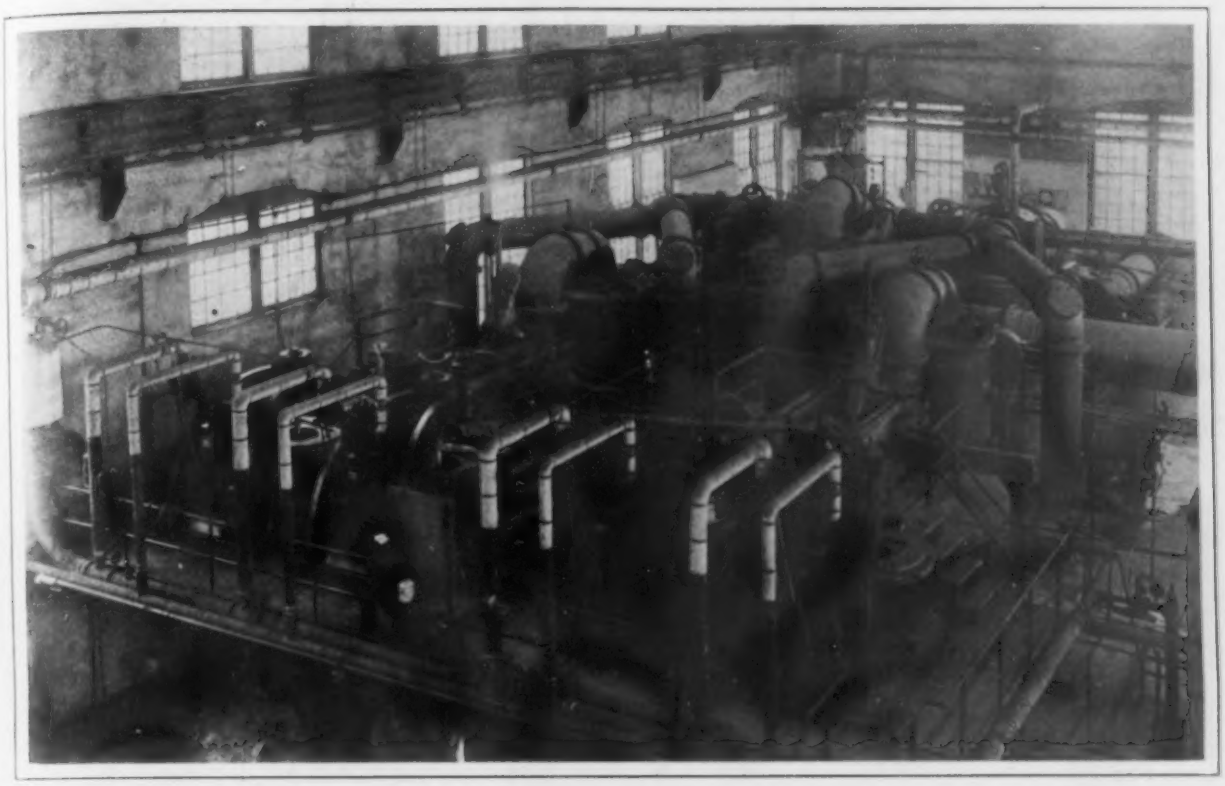
Provision has been made for a second breaker, and the 150-ton storage bin is located so that it may be available for use with either breaker. A by-pass is provided around the present breaker, so that in case of an accident to it the coal may be fed directly to the conveyor passing to the hammer mills, thus allowing the temporary supply of uncrushed coal to the mills. The delivery to the hammer mills is by chute from the conveyor, and the chute is provided with valves so that the stream of coal may be all sent to one mill or may be split, sending the desired amount to each. An additional conveyor may be added for supplying a second pair of hammer mills. Then the coal from either breaker may be fed to any one of the four hammer mills, and any unit may be reserved as a spare. Each hammer mill has a capacity of 150 tons of coal an hour, crushing so that 90 per cent. will pass through a ⅛-in. mesh screen and is independently driven by a 300-hp. motor.

The hammer mill building is of brick, made as tight as possible to prevent the spread of dust, and a solid brick wall, except for the openings for the shafts, separates the mills from the motors. The coal leaving the hammer mills is delivered to a conveyor underneath. This conveyor is horizontal for a sufficient distance to accommodate the present and future mills, and then is inclined to elevate the coal to the first of the two 400-ton bins which are provided in the mixer building.

The Larry Charging Car on Top of the Ovens. At the Right Is the Conveyor Lifting Coal from the Mixer Building to a Storage Bin Over the Ovens

The second 400-ton bin is filled by means of a short conveyor, to which the coal is diverted from the main conveyor by a gate, and the short conveyor is driven from the head pulley of the main conveyor. When using two kinds of coal with one kind in one of the 400-ton bins and the other in the second bin, the coal is drawn from the bottom of the bins by two mixer conveyors, the thickness of the streams being regulated by adjustable gates. These mixer conveyors discharge to mixer paddles which mix the coal, and the coal is then elevated by conveyor to a 1200-ton storage bin. From this it is emptied into the larry cars and taken to the ovens.

With the exception of the two short mixer belts, which are 48 in. wide and the refuse belt which is 18 in. wide, all of the belts for the entire coal handling plant are 36 in. wide, and the entire conveying system is designed for a maximum capacity of



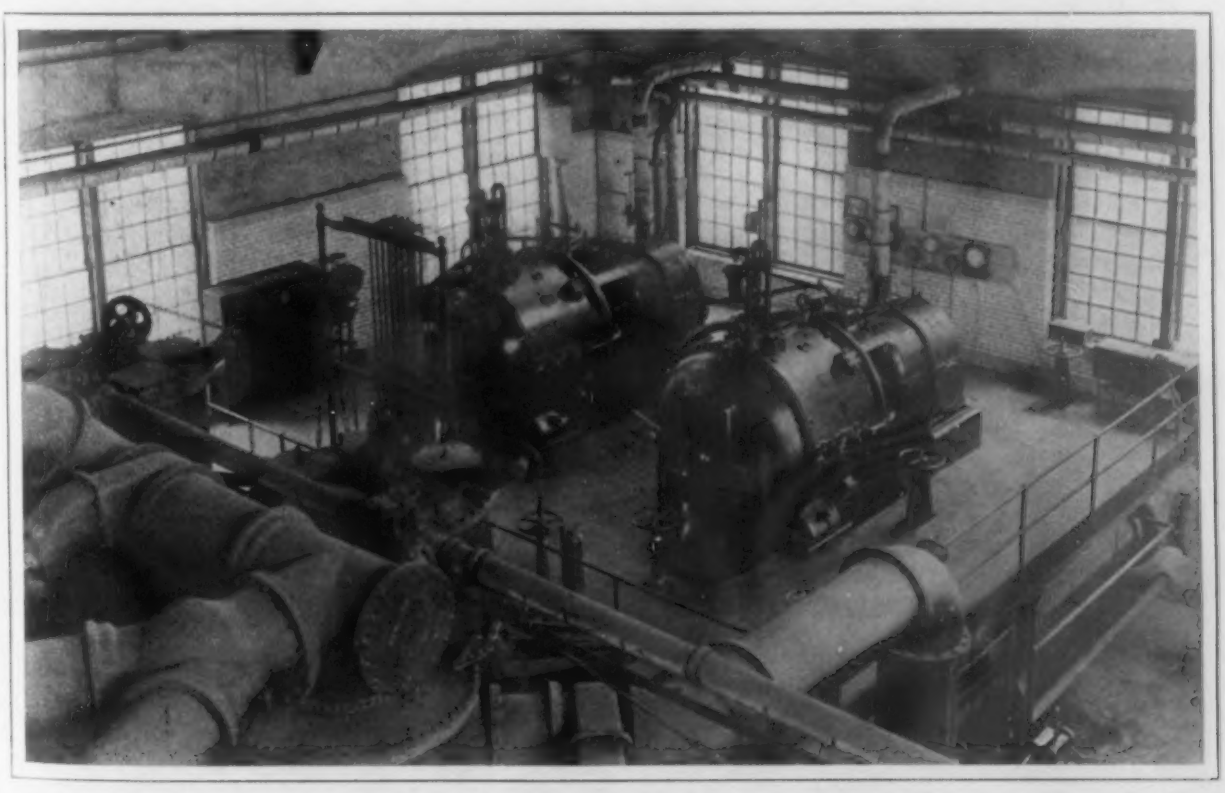
By-Product Apparatus, Dryers in Foreground and Beyond the Saturators, the Reheaters and the Tar Extractors with the Exhausters in the Far Corner

400 tons per hour, so that in order to double the present capacity of the plant it will only be necessary to add an additional breaker and two additional hammer mills. With the exception of the hammer mill building the structures for the coal handling machinery are built of steel, with concrete walks and floors.

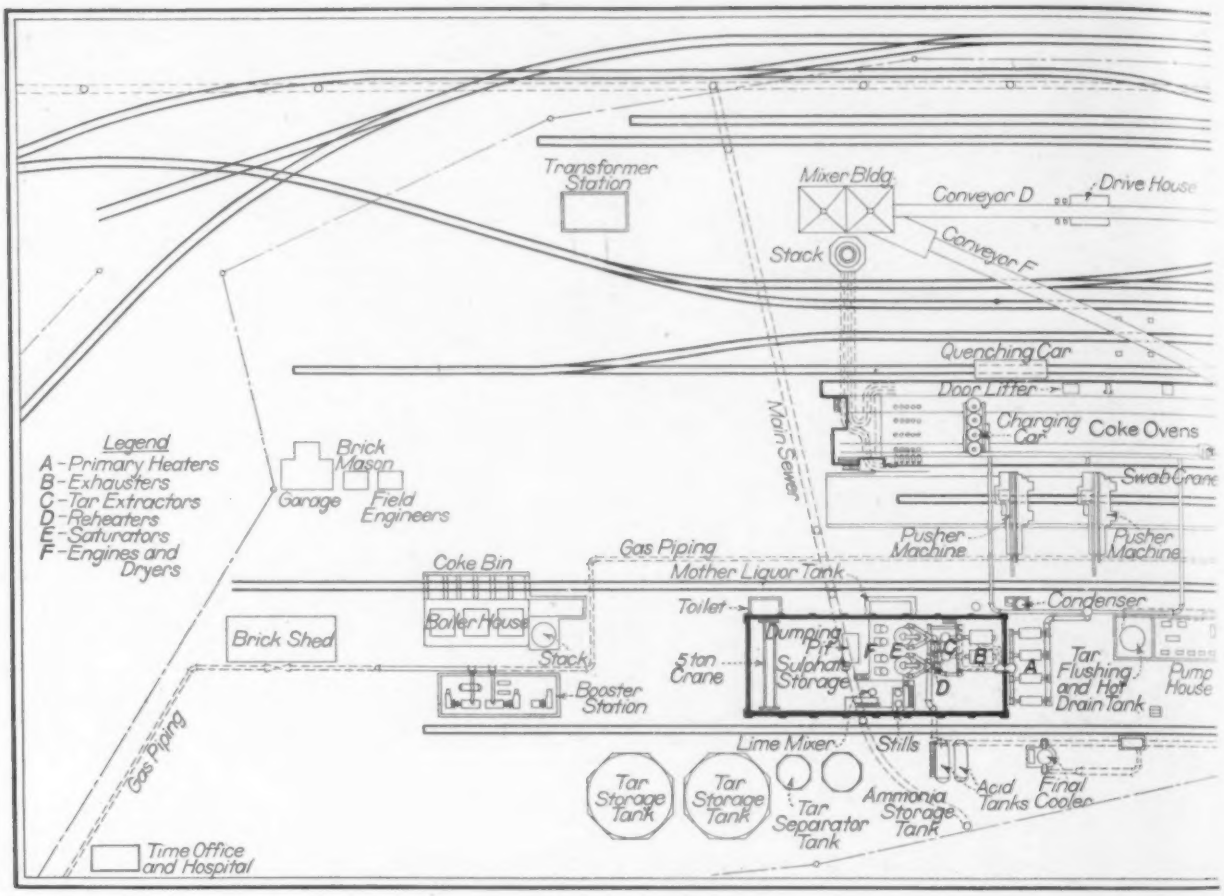
THE COKE HANDLING EQUIPMENT

The quenching cars discharge the coke to an inclined cooling wharf, which has sufficient capacity for three cars. The motion of the coke on the wharf is arrested by eight finger gates, each about 6 ft. wide. These gates are under the control of the operator. At the bottom of the wharf there are a series of rotary feeders, four being mounted on each shaft about 24 ft. long, and each shaft is driven by a 3-hp. back-geared motor through chain and gear reduction. The wharf is thus divided into halves, each half being controlled by one set of four gates and four feeders, so that in case of trouble with one half of the equipment, the other half may handle the full capacity.

When the charge has been discharged to the



A Nearer View of the Exhausters, with the Top of the Reheaters at the Left

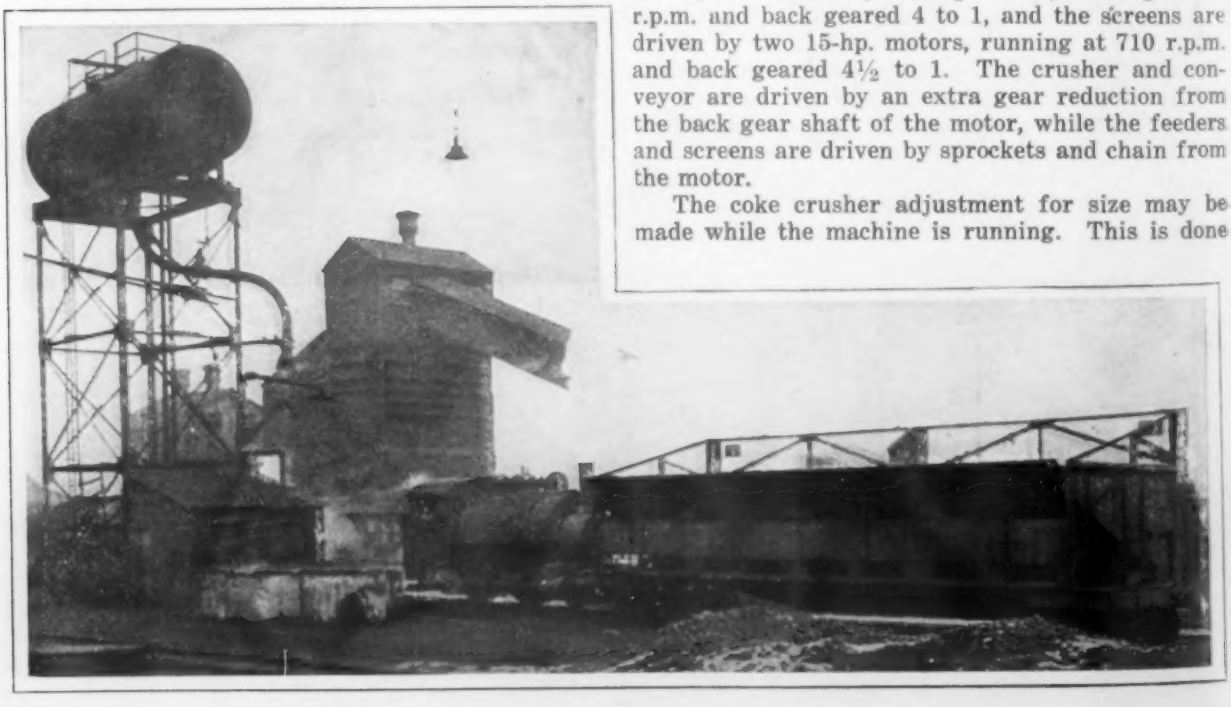


wharf, the operator starts the feeder at one end, raising the first finger gate and allowing the first section of the feeder to load the coke evenly to the conveyor. When this compartment is empty, the second gate is raised, and so on until the entire charge is fed to the conveyor. This method is found to insure an even feed to the coke crusher and screen, and also enables the operator to dislodge any pieces that may hang up before the gate is closed ready for the next charge.

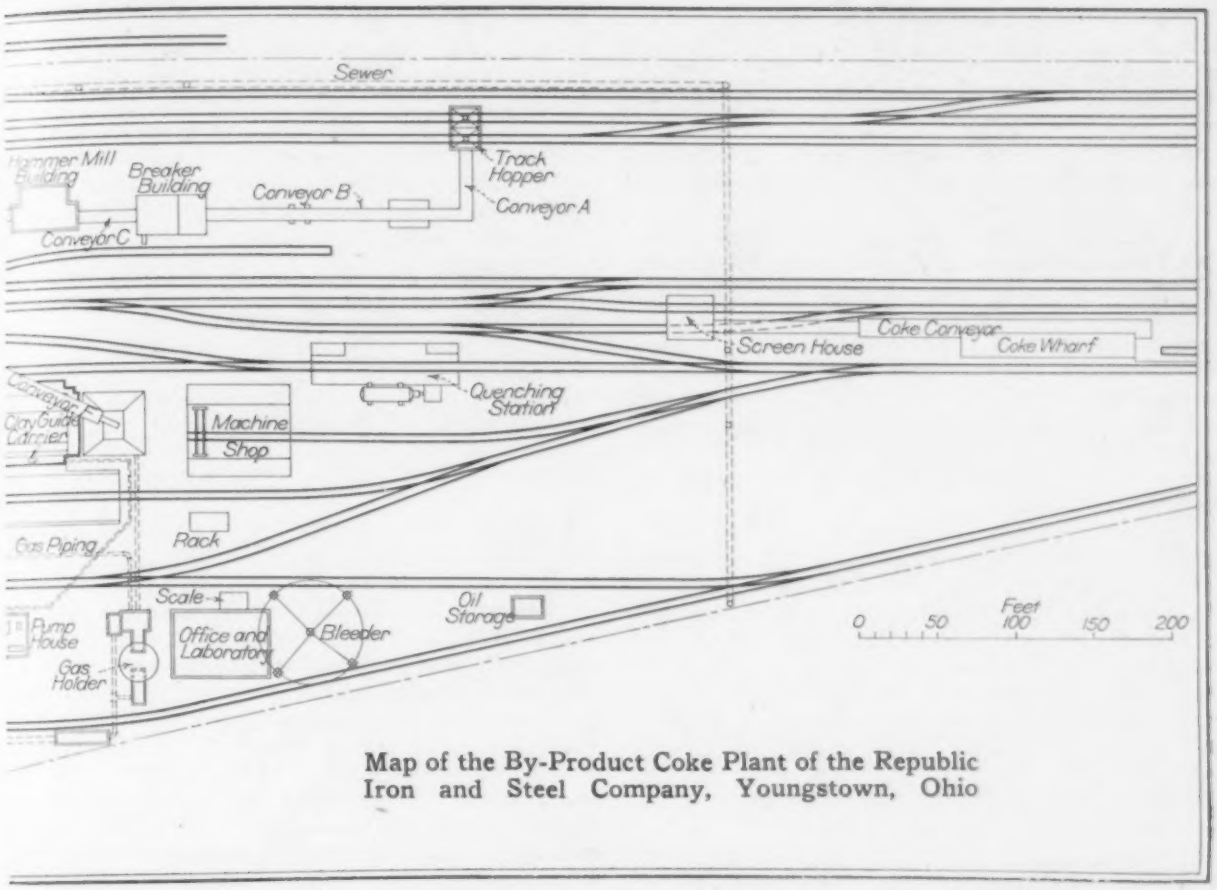
The conveyor elevates the coke to a set of grizzly bars which allow the fine coke to pass directly to the screens while the larger pieces go to the crusher. The crushed coke falls into a hopper and is fed to the screens. A butterfly gate is provided to control the flow of the coke to either of the screens. The screens are provided with perforations to make three products; furnace coke is discharged out of the end of the screen, pea from the end of the jacket and breeze through the jacket. Provision is made so that when desired the grizzly in front of the crusher may be removed, allowing the coke from the conveyor to pass directly to the screens.

The coke wharf feeders are driven by two 3-hp. back-geared motors, running 700 r.p.m. and geared 5.33 to 1. The conveyor is driven by a 7½-hp. motor, the crusher by a 20-hp. motor, running at 710 r.p.m. and back geared 4 to 1, and the screens are driven by two 15-hp. motors, running at 710 r.p.m. and back geared 4½ to 1. The crusher and conveyor are driven by an extra gear reduction from the back gear shaft of the motor, while the feeders and screens are driven by sprockets and chain from the motor.

The coke crusher adjustment for size may be made while the machine is running. This is done



The Quenching Station and Quenching Car and Locomotive; the Coal Breaker Building in the Background



Map of the By-Product Coke Plant of the Republic Iron and Steel Company, Youngstown, Ohio

by turning the square shaft at the back of the crusher which draws the rolls back. The rolls are 24 in. in diameter and 36 in. wide, with chilled fluted teeth. The segments are bolted to a cast-iron spider which may be removed and renewed without removing the roll shaft. The bearings are split on the quarter and may be removed for babbitting or scraping by removing the check plates without removing the rolls. The bearing shells are interchangeable, and the crusher is designed so that should unbreakable material pass into the rolls, they are free to move the compression of the spring without throwing the bevel driving gears out of mesh.

There are two screens 6 ft. in diameter and approximately 15 ft. 6 in. in length over all, with screening surface 12 ft. The screens are ⅜ in. thick with ¾ in. square perforations, and there is provided a jacket 8 ft. in diameter by 6 ft. in length, made of wire mesh with ⅜-in. perforations. Each screen is carried by four wheels 24 in. in diameter, and driven by bevel gear at its discharge end. Thrust rollers are provided to take up the thrust due to the inclination of the screens. The heads have a steel tire shrunk on and turned to gauge. The heads are tied together with heavy angles, one leg placed radially so as to offer the least obstruction to the discharge of the coke. The gear and pinion are of cast steel. The thrust rollers are carried on the pinion shaft, adjustment being provided so as to maintain proper meshing of the gear after the thrust rollers are worn. The pinion shafts are driven by sprocket and chain from back gear shaft of motor. The breeze chute is built of steel plate.

In addition to the unusually large storage capacity on the coke wharf, provision has been made for dumping the coke from the quenching cars directly into standard railroad cars in the event that anything goes wrong with the screening station.

The Coke Screening Station with Coke Cooling Wharf at Right

The by-product building, in which is located the turbo-exhausters, the tar extractors, ammonia saturators and the sulphate storage, is of brick construction and is designed to admit of doubling the capacity of the plant. The tar pumps and similar machinery are in a separate brick building and have independent means of drive, both steam and electric.

The electric power used for the plant is produced at the blast furnaces and transmitted to the coke plant at 6600 volts and then reduced to 220 volts for use in the plant. An independent engine-driven generator of sufficient capacity to run any single operation of the plant is provided in case of an accident to the main supply of current. Steam for the coke plant is generated in three 300-hp. boilers arranged to burn gas or fine coke. Water is supplied from the main pumping station at the open-hearth plant.

In the building of this by-product coke plant, special attention was paid to installing equipment that would tend to make everything around the plant as safe as possible for the employees, and also to provide proper sanitary conditions. The coke ovens were installed by the H. Koppers Company. Practically all the coal and coke handling equipment was designed and erected by the Robins Conveying Belt Company, and all the structural steel work connected with the plant was erected by the McClintic-Marshall Company, Pittsburgh, Pa.

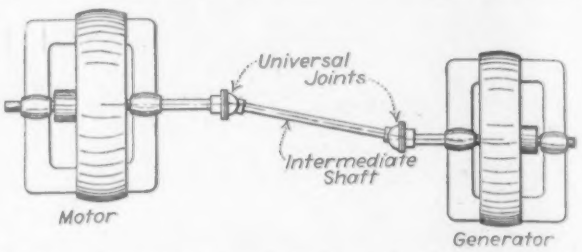
UNIVERSAL JOINT FRICTION*

Report of the Tests Made to Determine the Amount of Lost Power

As a form of mechanism for the transmission of power the universal joint is well recognized. During the past three years two standard makes of joints have been under observation and test in the laboratory of the mechanical engineering department of the University of Kansas. The object in view has been to determine the loss of power due to friction in the joint while operating under such loads and speeds as are common in automobile service. In these final results it is believed that all appreciable errors have been eliminated and that they give representative values of what may be expected as friction loss in the operation of transmission joints, operating under conditions of good lubrication and within the limits of the loads for which the size of bearings is appropriate.

The two joints which have been tested are standard forms of the joint, although somewhat different in general design. No. 1 was carefully machined and effectively protected from dust, while No. 2 was made up of comparatively heavy drop forgings without special coverings. These differences were without effect, it may be assumed, in the laboratory tests, and the results indicate but minor differences. In each case two complete joints connected by an intermediate shaft were employed, so that in service during the tests power was transmitted through the set from the primary shaft to a parallel secondary shaft. All observed data relate therefore to the loss occurring in two joints.

When used commercially for power transmission the single universal joint gives rise to vibratory and unsteady motion. Whenever possible two such joints and an intermediate shaft are used, so that the driving and the driven shafts are always parallel to each other, but the perpendicular distance between the two can be freely varied between certain limits. While the intermediate shaft rotates with a vibratory motion this arrangement eliminates all variation in the velocity ratio between the two main shafts, providing the forks on the intermediate shaft lie in the same plane. All variation between the two main shafts is also eliminated when the angles



Drawing Showing the Arrangement of Motor and Generator Employed to Determine the Friction Losses in a Universal Joint Shaft at Various Speeds and Angularities

between the intermediate shaft and the two main shafts are equal. However, if the forks on the intermediate shaft are at right angles to each other, the variation in angular velocity in the intermediate shaft is multiplied in the transmission to the second main shaft, and the velocity variation between the two main shafts is then twice as great as that if but one universal joint had been used. This point is not appreciated by the average person using machinery that contains universal joints and little care is shown in assembling the joints, about half of the joints being wrongly assembled, the forks on the intermediate shaft being at 90 deg. or some other angle to each other.

The universal joint finds extensive use in certain classes of machinery such as agricultural machinery, milling machines, multiple drilling machines, presses, steel mill rollers, testing machines, etc. At present, however, the most important use of the universal joint is in automobile construction where it is often used in place of chain or straight shaft drives to transmit the power from the crank or engine shaft to the driving shaft geared to the back axle. Usually these two shafts are parallel but do not lie in the same straight line nor at a fixed perpendicular distance apart.

In considering the several possible methods of measuring the power transmitted by line shafting the accuracy required to determine the relatively small value of the friction losses in the universal joints put the general class of dynamometers out of the question, and it was early decided that to obtain any accuracy whatever with the facilities and time available, electrical methods should be used throughout. It was decided to use the Puffer modification of the Kapp load-back method of testing. In this method of testing two machines, preferably of the same size, make and rating, are both electrically and mechanically interconnected. One machine operates as a motor and drives the other mechanically as a generator. The current generated by the generator is loaded back on the motor supply line. Since one machine takes power as a motor and the other returns power as a generator, the net power taken from the line is only that which is required to supply the total losses of the system. If the two machines are similar in construction, size, and rating and providing that there were no transmission loss, then the losses of one machine would be equal to half the total losses except for a small error due to the opposite effects on armature reaction in the two machines. Then very approximately the power transmitted from the motor to the generator would

*From a paper by P. F. Walker and W. J. Malcolmson, presented at the annual meeting of the American Society of Mechanical Engineers, New York City, December 2, 1914. The authors are respectively professor and student of mechanical engineering at the University of Kansas.

be the load on the generator plus one-half of the total power supplied by the line.

Mechanically the two machines were connected by the universal joint set, consisting of two joints and an intermediate shaft. The motor was bolted in a fixed position to the floor. To secure a deflection of the intermediate shaft, the generator was offset by moving it along its guide rails. The amount of offset to give the required angular displacement on the intermediate shaft was determined by a simple trigonometric calculation of the tangent of the angle in terms of the perpendicular lateral distance between the two shafts, this distance being always constant. The generator was offset so that its shaft was always parallel to the motor shaft. The change in distance between the ends of the two main shafts, measured on the diagonal, was provided for by the slip of the square end of the shaft in the sleeve of the joint fork.

It was assumed that the losses in the joint under a straight line drive were zero, no matter whether the forks on the intermediate shaft were at 90 deg. or in the same plane. The actual losses in the joints, credited as friction losses, were then obtained by subtracting from the total losses at a certain deflection, the total losses at straight-line drive for the same imposed conditions of load, speed, etc. There is no criticism of this assumption and method of obtaining the actual losses when the joints are properly assembled, that is, when the forks on the intermediate shaft are in the same plane. However, when the forks on the intermediate shaft are at 90 deg. to each other, as already mentioned, the motion transmitted when there is any angular displacement is not uniform, but vibratory in nature. In the actual operation of the machines with the joints so arranged, there was noticeable a distinct vibration and knocking which was not present when the joints were properly assembled. This vibration increased as the angle of deflection increased, sometimes becoming so pronounced for the larger angles that it was found to be unsafe to try to operate. When the joints were so operated it was also noticed that the data obtained were somewhat more uncertain than when the joints were properly assembled. Then with the forks on the intermediate shaft at 90 deg. the assumption made as to the actual losses in the joints would not be exactly correct, as such vibrations and knocking that were present would cause the total losses of the system to vary more or less.

Two general methods for securing readings which should cover variations, both in load and angle of inclination were followed. One consisted in lining the shaft exactly for straight line drive and under this condition of zero loss operating the joint through a wide range of loads. This being done, the driven machine would be offset to give any desired angle and the apparatus then be operated through exactly the same range of loads, speed being held constant for all conditions. The other method consists in holding both speed and transmitted load constant during the entire series of observations. In this case, with the shafts in direct line for straight line drive, the initial value of total loss corresponding to zero loss in the joint is determined. After this, with the machines still running, the generator would be moved to give the proper offset angle and the readings for that condition taken with but a few moments' delay. This would be repeated for as many angles as desired. It will be understood readily that one of the most difficult conditions to maintain in such a series of tests is a constant temperature in the field coils of the electric machines. The latter of the two methods of procedure mentioned above has a point of advantage in this regard, since a whole series of observations throughout the range of angular variation could be secured without stopping the machines or changing the conditions of load.

In the calculation of efficiency of the joints it has seemed wise to make the conclusions applicable to a complete system including the two joints necessary to secure parallel operation of the main shafts. Two joints are necessary in any system where such speeds as these under consideration are likely to occur. In other forms of application of the joints conditions are likely to be such that the question of friction loss is of no significance. In case a knowledge of the efficiency of a single joint is desired, it may be assumed without sensible error that the loss is one-half of the amount recorded and that the efficiency would be indicated for each condition by a fraction which is the arithmetical mean of the figure given and unity. The difference between the amounts of power transmitted by the two joints is so small as to be outside any possible limits of observation.

For any power and angle the power is the amount transmitted at the joint, being the sum of the load delivered by the driven generator and the losses of that machine. It follows, therefore, that efficiency equals the power transmitted divided by that power plus the friction loss; that is, it is power delivered divided by power received by the joints.

From the results obtained it was noted that for loads amounting to one-half the rating of the set, or more, the efficiency is nearly constant and the loss very small for angles of inclination not exceeding 6 deg. For larger angles the loss becomes an appreciable amount. The constancy in the efficiency fraction indicates a constant value of the coefficient of friction on the joint journals, since the bearing pressures are proportional to power transmitted while speed remains constant. Under conditions of service the questions of lubrication and protection from dust are important. In the efficiency calculation a downward tendency was noticeable at the largest loads although it is not visible on the curves. Doubtless it marks the point where the bearing pressures on these journals make lubrication imperfect. The rocking motion of the journals tends to squeeze out the oil.

Convention of Supply and Machinery Men

The next convention of the American Supply and Machinery Manufacturers' Association will be held in Philadelphia, Pa., the first week in June, 1915. In connection with the meeting will be held the convention of the National Supply and Machinery Dealers' Association. The largest number of delegates ever attending a convention of the two associations is looked for, partly because the meeting place has been chosen for the convenience of all and partly because the conventions of the Railway Master Mechanics' and Master car Builders' associations are to be held at Atlantic City immediately thereafter.

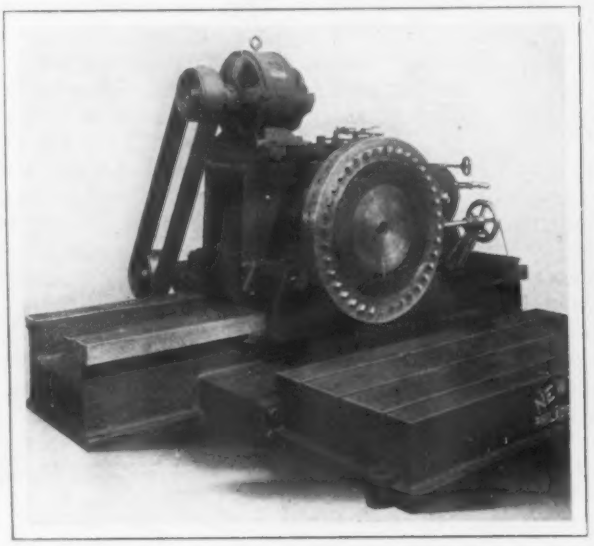
The American Roller Bearing Company, Pittsburgh, Pa., is furnishing good quantities of its non-lubricant roller bearings for use in connection with machinery for making window glass. These bearings will operate in very high temperatures, such as occur when exposed to molten glass, under which conditions they will be required to operate without the use of lubrication. The high temperature to which bearings are thus subjected precludes the use of any type which requires a lubricant. Oil and grease have proved ineffective, as they are quickly destroyed by the intense heat. These non-lubricant bearings will support a load of 6000 lb. and will be required to operate 24 hours per day.

S. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, Pa.

Building Rotary Planing Machines

Some of the Processes Employed in Their Construction and the Work That They Are Designed to Handle

In the development of its rotary planing machines, the Newton Machine Tool Works, Inc., Twenty-third and Vine streets, Philadelphia, Pa., has endeavored to increase the productive capacity of the machine for finishing flat surfaces on steel and iron castings. These machines were originally designed to finish the bases of columns or other structural shapes at greater productive rates than were possible with a single tool carried on a swinging arm, such as was formerly employed, but even this increase in output is not sufficient, and the call is for a machine having still greater capacity.

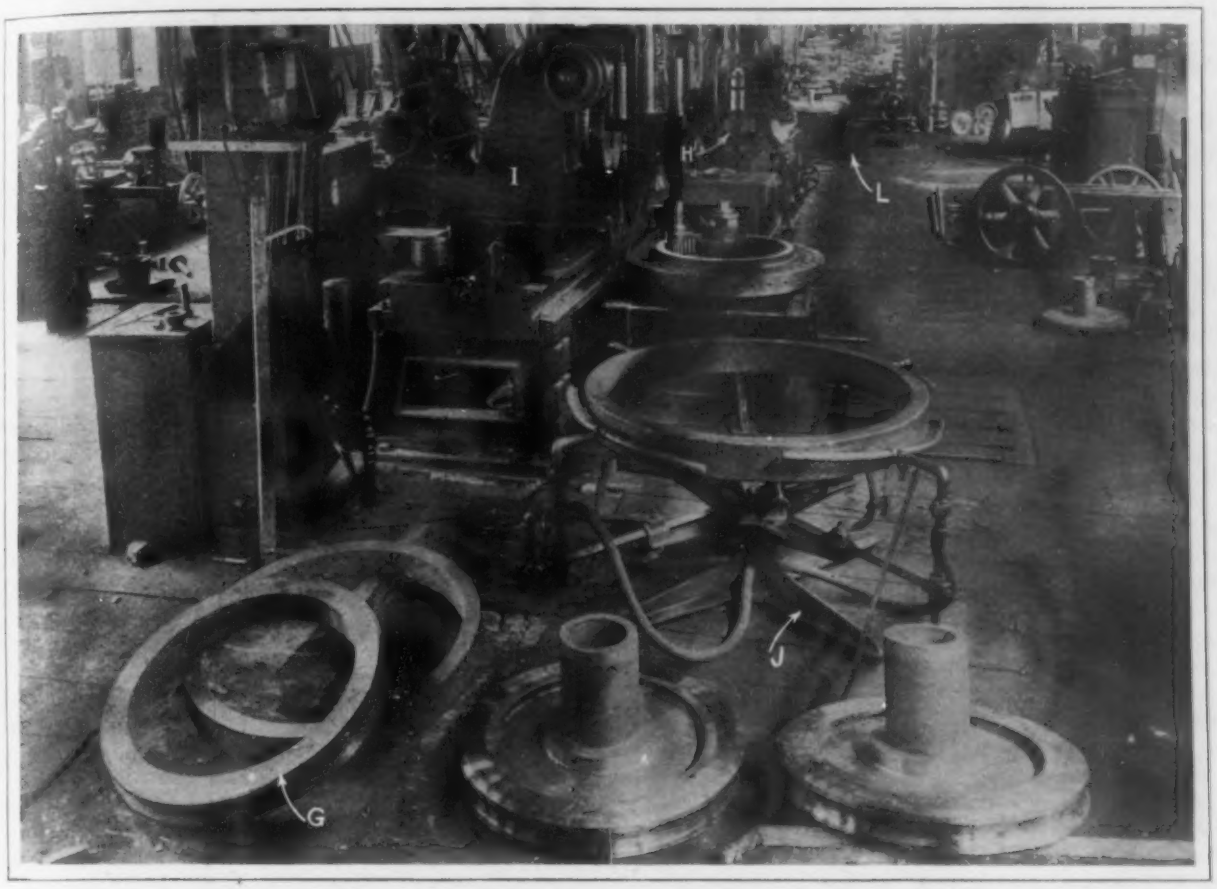


One of a General Line of Rotary Planing Machines

In the latest development of this type of machine, a belt connection is employed to transmit power from the motor to the driving shaft. The motor is mounted on the saddle and travels with it, an arrangement which is relied upon to eliminate vibration due to torsion in the long feed screws and splined driving shafts of the earlier machines. A machine of this type has been used in the builder's shop on the erecting floor for finishing cast-iron surfaces 20 in. wide. Here it has removed metal to a depth of ¼ in. at a feed of 6 in. per min. without any appreciable strain on the machine or wear on the cutters.

The cutter head used is a steel casting surrounded with a steel band, to which are fitted submerged tool clamping screws to comply with the recent liability laws enacted by the various state legislatures. The drive to the head is transmitted through an internal gear, the teeth of which are cut from a solid casting in the back of the head. A patented feed box renders six changes available. Latch levers control the sliding sleeves, which are incorporated in the construction of the feed box, and each sleeve carries one of several groups of gears, giving feed changes and reversing fast power traverse to the saddle. The work table on the machine is of the fixed type, and the depth of cut is controlled by an adjustment of the spindle travel. In the design of the machine care was taken to insure flexible, convenient control to secure pro-

Section of the Plant in Which the Planing and Boring Are Done



Finishing the Cutter Heads and Expanding the Clamping Screw Bands

duction at the highest possible rate by reducing as far as possible the time that the machines were idle. One of the special features of the machine is that there are only three points of control, the top lever regulates the direction of traverse for the feed and fast power motion clutches, and is arranged to prevent conflict, while the in-and-out adjustment of the spindle saddle which gives the depth of cut is controlled by a handwheel.

In replanning the layout of equipment during the past year to insure dispatch and directness in the methods of manufacture, the requirements of the rotary planing machines were given special consideration in laying out the several departments having to do with their manufacture. In the entrance end of the shop where the rough materials are received, are located both the planing and boring departments. In one of the accompanying engrav-

Boring and Turning the Clamping Screw Bands

ings is reproduced a photograph of these departments, in which it will be noticed that most of the machines are operating on parts of rotary planing machines. This photograph, together with the other interior views, was taken on Saturday afternoon so as not to interfere with the operation of the shop. The machine for planing the saddles of the rotary planing machine is illustrated at A, while at B are shown spindle heads ready for boring in the saddles, and at C is a view after the boring operations are completed. One of the work tables which has just been removed from the planing machine is illustrated at D. After these parts have been completed they are taken to the bay E and the parts requiring only planing are passed to the erecting floor for drilling and assembling. The other parts remain in this bay, a portion of which is illustrated. The clamping screw bands are bored and turned on a Betts Machine Company boring and turning mill shown in the foreground. This machine is also employed for boring and turning the steel cutter heads F and the wormwheel rings G as well as the centers for the driving wormwheels and the other bronze parts. From the boring mill the cutter heads are taken to the milling machine H, where the tool slots are milled in. The next step is the cutting of the internal gear, which is done on the gear cutting machine I. The gas heaters at J are employed to expand the bands, and after they have been brought to the proper temperature the cutter heads are lifted into position inside the ring, which is then allowed to cool.

Other machines used in the construction of the rotary planing machines are a special grinding machine built to the Newton Company's design for grinding the hardened worms and the bronze wormwheel teeth to an accurate bearing. This machine while not clearly shown in the photograph is located at K. Various machines to complete the other parts are located in the background at L. These comprise special combination spiral, spur and wormwheel cutting machines and worm and keyseat milling machines.

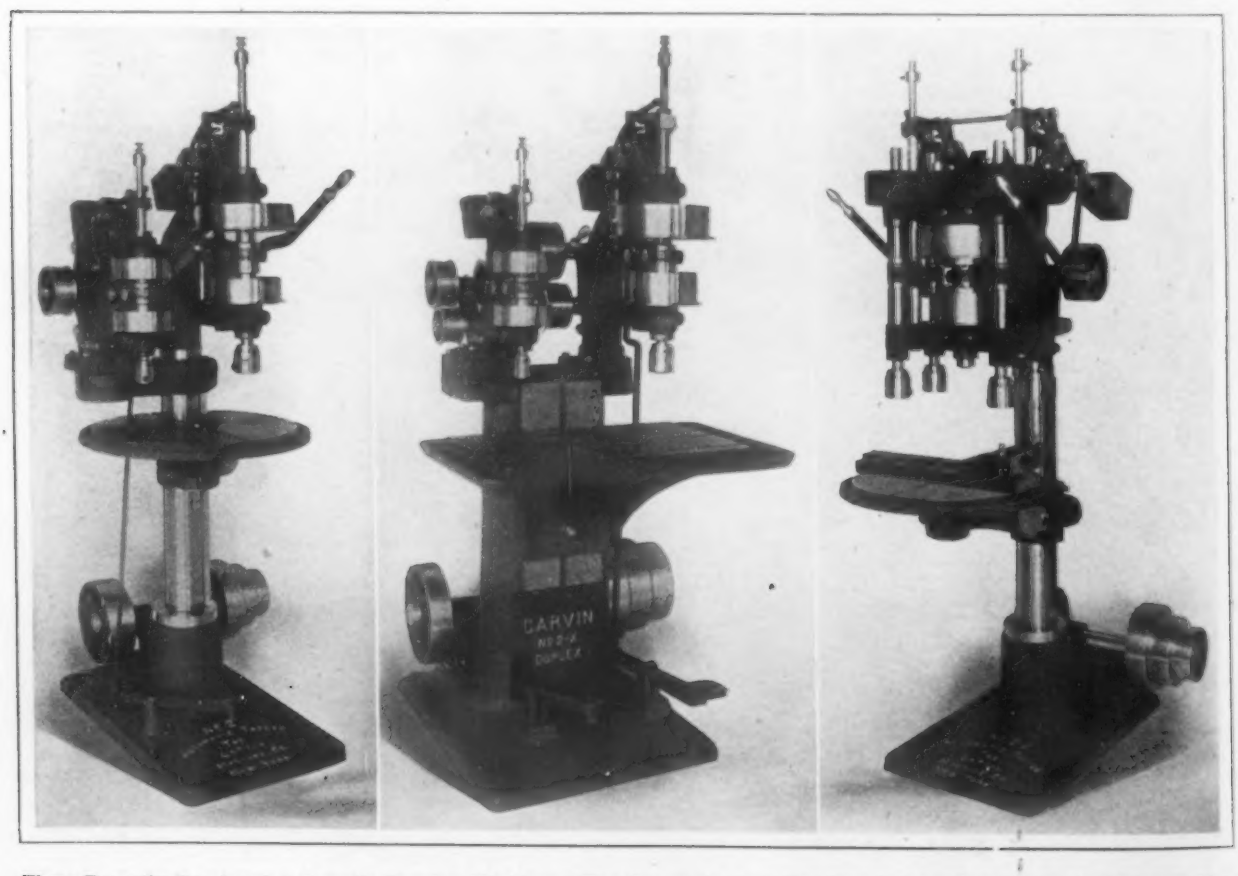
Three New Automatic Tapping Machines

The Garvin Machine Company, Spring and Varick streets, New York City, has recently made three additions to its line of automatic tapping machines. These machines operate in general the same as the others of this line. The spindles are fitted with two friction pulleys running in opposite directions, and once the tap is started the machine works automatically to tap the hole to a predetermined depth, which is controlled by an automatic trip, and reverse the tap.

All three machines are shown in the accompanying illustration. The one at the left is equipped with two sizes of head. This enables work having two holes differing so much in size that it would not be practicable to have both heads of the same capacity to be handled by a single machine. Both of the heads are independent of each other, and the one at the left can be operated either by a hand lever or foot treadle, while the other one is equipped for lever operation only.

In the machine at the center two sizes of head are used, but in this case the difference in capacity of head is greater than in the first machine. Foot treadles are used to operate both heads of this machine and thus leave the hands free.

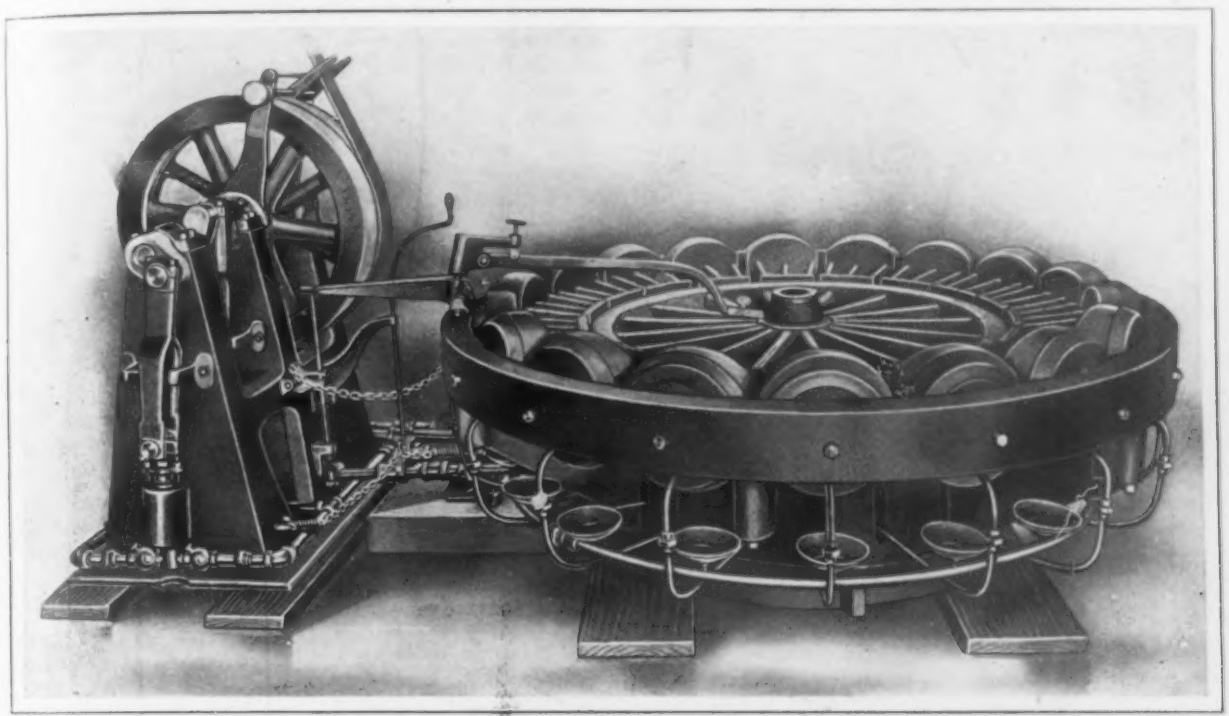
The machine at the right is designed to perform both rough and finished tapping on a single machine. Here four spindles, arranged in two pairs, are provided, each pair being operated by an independent lever. The spindles at the right are used for the rough work and those on the left for finishing. The work for which this machine is particularly designed is the tapping of deep holes in tool steel which require rough tapping as a preliminary operation. The work is performed with but one clamping, as the fixture is moved along the slide from one pair of spindles to the other.



Three Recently Developed Automatic Tapping Machines. The One at the Left Has Two Independent Heads for Different Sizes of Taps, Both Heads of the Middle Machine Are Independently Operated by Foot Treadles, and in the Machine at the Right the Spindles Are Operated in Pairs by Independent Levers

A Hydraulic Ring Compressing Machine

In recent years the hydraulic tire setter built by the West Tire Setter Company, Rochester, N. Y., has been adapted for a variety of other work. This includes the compression of steel rims for automobile wheels, pipe couplings used in the gas and oil regions, fifth wheels or circles for wagons, etc. This work is done with the material cold, and is accomplished without making any change in the equipment of the machine other than the furnishing of a positive stop for the rams to insure the work being finished to a true circle of the proper diameter.



A Compressing Machine Operated by Hydraulic Pressure for Forming Rings, Hoops, Tires, etc., While Cold, Into Circles of Various Diameters

The machine consists of a cast-iron base supporting a weldless rolled-steel ring, around the inner side of which is located a circle of hydraulic rams. These are mounted on the bed casting in such a way as to move in radially toward the center when pressure is applied. Oil is employed as the pressure medium, the pressure being obtained by a belt-driven triplex pump which forces the oil into a central reservoir from which pipes radiate to the several rams. This arrangement, it is pointed out, insures a uniform pressure on each ram.

Where the machine is to be used for its original purpose of tire setting for wagon or truck wheels the tire is welded slightly larger than the wheel. The tire is then mounted in the machine and the wheel placed inside of it, after which the machine is set in operation and pressure is applied to the tire until it has been forced tightly upon the wheel and the latter given the proper degree of concavity. The use of this machine, it is pointed out, gives the same results as though the tire had been hot when placed on the wheel and had shrunk by cooling.

President Clarence H. Howard, of the Commonwealth Steel Company, St. Louis, expresses the opinion that the increased freight rates granted by the Interstate Commerce Commission will lead to the almost immediate employment of 10,000 persons in and about St. Louis connected directly and indirectly with the railroad supply business, etc., the decision having confirmed several large orders which were given recently on contingent conditions.

Solid Steel Ingots and Castings

A process for making sound steel ingots or castings has been patented (U. S. 1,116,899—November 10, 1914) by Lewis B. Lindemuth of Steelton, Pa. It consists in placing on top of the ingot or casting, after it has been poured, a combustible in the form of a metalloid that has a high heat of combustion and that, when oxidized by an oxidizing blast, will not enter into the steel nor change its composition. The substances recommended are silicon as ferrosilicon (50 per cent.), titanium as ferrotitanium or aluminum, any one of which is prone to form slag rather than to combine with the metal or dissolve in it except to a very limited extent. It is claimed that under the most unfavorable conditions these substances will enter only about an inch into the surface of the metal that is agitated by the blast. All have a specific gravity less than that of the molten iron. The heat of combustion maintains the top of the casting molten until after the body has set sufficiently to overcome any tendency to form a pipe. The inventor states that 50 per cent. ferrosilicon has been used with uniform success on a large number of ingots and castings. The ferrosilicon is added from time to time in small lumps to the surface of the metal, which is agitated by the blast of air under pressure from a ½-in. pipe. About 5 lb. of ferrosilicon per ton of ingots is required. The results of a large number of analyses show no appreciable change in the metal's composition.

A patent (U. S. 1,112,909—October 6, 1914) has been granted to John A. Hunter, Philadelphia, Pa., for a process of converting cast iron into steel or malleable iron. It consists in heating the cast iron in a furnace to a temperature below its melting point and then permitting such agencies as nitric acid to enter the furnace. It is claimed that the vapors of the acid by decomposition decarbonize the metal and effect other changes so as to produce a metal having superior qualities for being rolled, hammered, drawn, tempered, etc.

In a patent (U. S.—1,093,892) Victor Stobie, Sheffield, England, claims that pig iron can be improved so as to be equal to cold-blast iron by treating the liquid metal in an electric furnace under a refining slag. This slag should consist of about 60 per cent. lime and 40 per cent. silica. The metal should be kept free from iron oxide by adding carbon or some deoxidizer. Throwing limestone into the bath keeps it well stirred by the evolution of carbon dioxide.

Machine for Marking Shrapnel Fuse Caps

For graduating and numbering in a single operation the bevel fuse caps used in connection with shrapnel shells, the Noble & Westbrook Mfg. Company, Hartford, Conn., has placed a special

A Special Machine That Has Been Developed for Graduating and Marking the Bevel Fuse Caps for Shrapnel Shells and Graduating Bevel Surfaces Such as Micrometer Collars for Lathes, Milling Machines, etc.

marking machine on the market. It is an addition to the company's line of slate marking machines. In addition to being used for the preparation of war material, the machine is also suitable for graduating any bevel surface, such as micrometer collars for lathes, milling machines, etc. It is pointed out that the graduations are placed on the bevel surface with but a single turn of the hand lever for a complete set. If desired the machines can also be used to put lettering on bevel surfaces instead of graduations.

In operation the graduating die is held in a holder keyed to the shaft which, as the mark is made, revolves with the die. This rotary movement winds a spring tension provided to return the work holder to the proper position to mark the next piece as soon as the contact with the work is broken. Bronze bearings with collar adjustment are provided for the shaft. The work is held in place with relation to the die by a set of accurately cut gears and the impression is made by foot pressure, which is applied through a lever and a cam. Adjustments are provided, whereby it is possible to regulate the depth of the impression to 0.01 in., with evenness and accuracy of the impressions.

The T. P. Walls Tool & Supply Company, 83 Walker street, New York City, has placed a new type of soldering copper handle on the market. The handle is made of pressed steel 0.065 in. thick and is provided with a groove which is relied upon to lock the handle and the copper as though the two parts were originally cast together. An advantage claimed for the handle is coolness irrespective of the degree to which the copper may be heated.

A First Aid Jar for Industrial Plants

To meet all the requirements of a compact, convenient, and sanitary first aid outfit, the Conference Board on Safety and Sanitation, of which M. W. Alexander, General Electric Company, West Lynn, Mass., is secretary, has developed a standard jar. This jar has been approved by the board which is composed of representatives of the National Founders' Association, the National Association of Manufacturers, the National Metal Trades Association and the National Electric Light Association, and is being furnished at practically the cost of the materials to encourage the use of safe, simple and efficient treatment of injured workmen by laymen.

The jar itself is structurally strong and a special annealing treatment makes the glass still stronger. Smooth surfaces and particularly straight walls on the inside are used to promote cleanliness and facilitate the removal of first aid materials. A convenient carrying handle is molded in the glass cover of the jar, which is held in place by spring clips that form a part of the metal cage in which the whole jar sets, this cage being relied upon to afford added protection against breakage. A rubber gasket between the jar and the cover is employed to make the outfit dust prooof.

The hight of the jar is only sufficient to accommodate the bottles stored in it, so that the stoppers cannot come out when the cover rests on the jar. Medicine bottles, bandages, absorbent cotton, burn ointment in collapsible tubes and a wire gauze splint are placed against the inner surface of the jar, so as to be plainly visible from the outside. A specially constructed metal dish placed in the center of the jar keeps the materials in their proper places and also serves as a receptacle for other parts of the contents, such as tourniquet, medicine glass, gauze bandages, medicine droppers, spoon, scissors, etc. The jar is only 9½ in. in diameter and 6 in. high, but it contains all the material which a large conference of physicians with extensive experience in the treatment of injuries have agreed upon as necessary for effective first aid treatment by laymen. Although it is not contemplated to use water in first aid treatment, yet when necessary both the jar and the metal dish can be used as water vessels.

Suitable first aid instructions are printed on the inside of the cover, so as to be readily available in convenient form. The standard list of material, which should always be kept in the jar, is given on the outside of the cover, together with brief directions for the use and care of the outfit.

A First Aid Jar Designed for Use in Industrial Plants in Which the Contents Are Arranged So That Any Desired Article Can Be Removed Without Disturbing the Rest

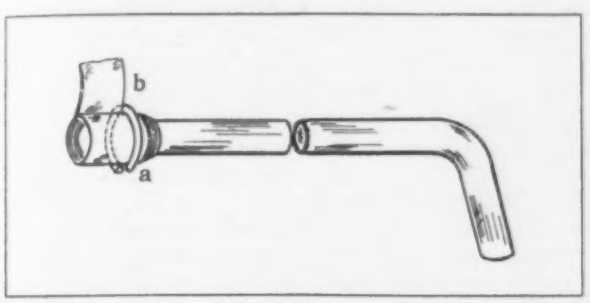
A SANITARY MOUTH PIECE

Use of Individual Ones Made of Rolled Paper for Machine-Shop Blowpipes

BY JAMES E. COOLEY

The uses of blowpipes in machine work are many and varied. The chief ones are for blowing out chips from drilled holes in castings that are too large to tip over merely for the purpose of emptying the chips and for blowing chips out of T-slots, splines and similar places in work that is done on planing and milling machines. These blowpipes are usually made from ⅛-in. wrought-iron pipe, having one end slightly bent over to prevent the chips when blown from bounding back in the face and eyes of the workman. If the pipe were left straight, this would happen, as it would then be necessary to hold the face over the hole or the place from which the chips are to be blown.

The general practice of workmen in placing these pipes in their mouths and also in using one blowpipe among several workmen, as is the case with drilling machine operators, etc., is an unsanitary feature in their use. A suggestion for a sanitary mouth piece which is easily attached to a blowpipe is shown in the accompanying drawing. This consists of a narrow strip of thin paper, wound on the end of the pipe and fastened with a wire ring, *a*. The paper is wound with a slight taper, in order that the ring may be inserted from the rear end of the roll. When the paper has become soiled, one circle of the roll can be torn off, as shown at *b*, the front part of the ring *a* serving as a guide to secure a straight tear. The ring also prevents the paper from becoming soiled when the pipe is laid down.

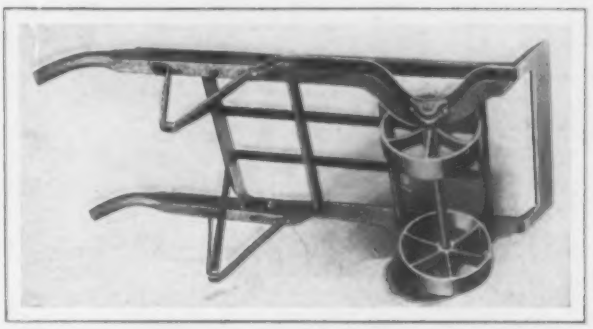


A Sanitary Mouth Piece for Blowpipes Designed to Do Away with the Common Practice of All the Workmen Using the Same One

New All-Steel Factory Hand Truck

The Edwards Mfg. Company, Cincinnati, Ohio, has developed a line of steel trucks, designed to take the place of the old style wooden frame trucks. They are intended for heavy factory use, as well as for handling heavy freight and warehouse and packing house service. Among the special features of the truck may be mentioned a continuous U-frame for the upper portion and the placing of the wheels within the body line, thus allowing obstacles to be passed readily. The use of the continuous U-frame, it is pointed out, supports the wheels in a substantial and durable manner and also gives strength and rigidity. In addition to the truck illustrated, which is intended for general factory use, special trucks for cotton bales and one for handling barrels in which the body is slightly concave instead of straight are built.

The frame of the truck is made of steel angles 2½ in. on each leg and 3/16 in. thick. This frame bends down to unite the body to the wheels and also crosses between the handles. The cross bars are of 1½ x 1½ x 3/16-in. steel tees. All the joints of the truck are riveted, no bolts being used except for fastening the wooden handles and the boxes in which the axles run. The handles, which are made of straight grain timber and bent by steam, are reinforced by a steel angle. It is pointed out that while accidents are rare, if one should occur, a broken handle can be replaced in 5 min. The trucks are made in one size only for all styles, the length being 62 in. and the width 24 in. The length of nose of the truck is 6 in. and with the exception of the cotton truck, which weighs 110 lb., the weight is the same, 120 lb.



One of a Recently Developed Line of All-Steel Hand Trucks for Factory and General Purpose Service

What Railroad Track Scales Must Sustain

In connection with recent investigations bearing upon the design of railroad track scales, the Standard Scale & Supply Company, Pittsburgh, Pa., calls attention to what it believes are not commonly appreciated conditions of service. Taking the 150-ton track scale as an illustration, explanation is made as to why so large a scale is necessary for the proper weighing of even the heaviest railroad equipment, of which the 50-ton gondola is a representative type. This company emphasizes that the apparent excess in the scale rating as compared with the car weight is not in reality a surplus or unnecessary capacity, but represents an essential, for the reason that the ordinary track scale is not subjected merely to a maximum dead load of 100,000 lb. plus the static weight of the car itself. On the contrary the scale is subjected to moving stresses and varying wheel loads induced by the passage of cars and locomotives over the scale. As the result of these live loads, stresses are set up in the supporting members of the scale structure much in excess of the distributed static load based on a 100,000-lb. capacity car at rest on the scales. If the scale be improperly designed, either as to ample strength or to bearing points in the lever system, permanent strains are certain to be set up in the scale which will result in incorrect weighing.

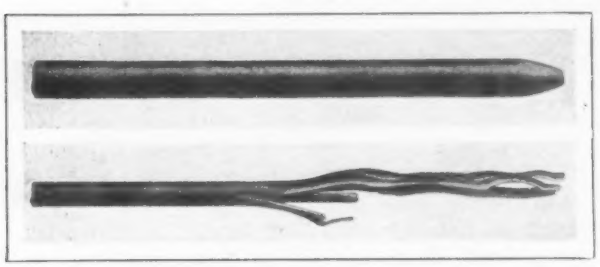
A scale may carry 150 tons on the weighing platform and register that weight correctly and without strain and yet be ruined by the movement of that load on or off the platform. Standard specifications have been worked out by the engineering staffs of some of the railroads indicating the maximum knife edge stresses per lineal inch for which the scale should be designed. From this unit basis the consumer may determine for himself what capacity scale he should have to meet the conditions under which the scale to be installed will operate.

Germany's iron-ore production for 1913 is given by Stahl und Eisen as 35,941,285 metric tons, having a value of 3.71 marks (88.2c.) per ton as compared with 33,711,142 tons in 1912 with a value of 3.73 marks (88.7c.) per ton. In 1913 48,047 miners were working as against 46,295 in 1912. Brown iron ore containing less than 12 per cent. of manganese constituted 3,005,970 tons of the 1913 total, while brown ore containing from 12 to 30 per cent. manganese amounted to 330,037 tons. Manganese ore of over 30 per cent. manganese totaled 760 tons in 1913.

BLAST FURNACE SCAFFOLDS

The German Use of Explosives to Remove Them

The use of explosives in dealing with blast furnace scaffolds and hangings is the subject of a recent article in Stahl und Eisen by Hermann Schoeneweg, in which the German methods are given. He was the first to introduce this process in Germany, applying it in 1896 on a furnace at the Burbacher Hütte. As carried out at present a tube welded at one end is used as the gun. It is 2.5 to 3.5 m. long (8 ft. 2½ in. to 11 ft. 5¾ in.), 65 mm. inside diameter (2.56 in.) and is shown before and after firing in the illustration. For the explosive an equally long tube is used that will readily enter



Gun Tube Before and After Shooting

the first one, and 50 mm. inside diameter (1.97 in.). A small hole is drilled in this second tube one meter from its mouth for the fuse, if electric ignition is not used. Mr. Schoeneweg prefers the use of a fuse on account of its greater certainty and simpler handling. After the inner tube is closed at one end with a wooden wedge, or in some similar way, and the charge of explosive introduced, the remaining empty space is filled with sand and the opening closed with a stopper of wet clay. The empty gun tube is now introduced at a suitable place in the furnace, a sufficiently large hole having been previously drilled. The fuse is lighted and the loaded tube with the burning fuse pushed to the end of the gun. In a similar way to this the Burbacher furnace was given repeated shots in 1896, and its operation improved until it went as well as before. Since then 68 other furnaces have been worked and the details of some of the cases from recent years are given below.

Case 1. At a furnace at B. the charge began to settle irregularly on February 19. In the night of February 21 to 22, tuyere one and the auxiliary tuyere over the slag tapping spout closed tight. On the next day it was decided to use explosives. All preparations were made and operation began on the day after. At 10 a.m. two shots were fired, the influence of which could be seen at the top; at 11.35 a.m. a third shot about two meters lower than the preceding ones, and about two meters inside the furnace. The charge settled about two meters. The blast was put on and the furnace worked regularly until midnight, but then it began to show a tendency to hang. By shutting off the blast it settled regularly, and it worked uniformly until the morning of February 25. At 10.30 a.m. two shots were fired, the charge settling about 8 in., and one more in the afternoon at 3.40, which had no apparent effect. The furnace however steadily improved and on February 26 it took 26 charges as against 8 on February 22, and soon reached its old output.

Details are given on eleven other cases, only three more of which will be given here:

Case 5. A furnace at E was so choked with dust that for four days no blast penetrated, although there were two blowing engines each of 2500 hp. Mr. Schoeneweg arrived at 3 p.m. and found that two holes had been driven through the brickwork. They were placed too low, and although shots were made they had no effect. Two other holes were drilled, and at 4.30 p.m. two heavy charges were set off simultaneously, the blast pressure being kept on. After the explosion flame showed at the top, the furnace began to take the blast and at 4 a.m. was working normally.

Case 6. The one at D. was the worst case encountered. The whole furnace for a considerable distance up consisted of a fused mass. At the brick work there was a free space of about 12 in. filled with loose coke. Eight series of vertical holes were bored, and after each lot of shots the furnace could be driven for a shorter or longer time. After six days of vigorous work it was believed the furnace would go, but in the morning it was found to be as bad as before.

After four days more work there were only two regular and one auxiliary tuyere open. A tube 3.5 m. long was finished, and a charge of 1.5 kg. dynamite given. After this the furnace took the blast and in half an hour the charge settled uniformly three meters, the furnace warmed up and gradually the other tuyeres could be opened. During the night conditions grew worse, an additional blowing engine being necessary. After several shots it went better, but then began to hang again. After a repeated heavy charge fairly low down it began to take blast again, and in half an hour settled over three meters. It continued to improve, and no more explosives were used. It is extremely doubtful whether the furnace could have been pulled through, without the use of this method.

Case 11. A furnace at S. showed through the open tuyeres a roof-like scaffold extending clear across it. It was about two meters thick and would not allow the blast to penetrate. During the stoppage 25 tons of coke were thrown into the furnace. Eight holes were drilled in the base of the scaffold, and after the eight shots had been fired the furnace began to take the blast properly. After two hours it was noticed that conditions were not right above. The blast was stopped, and it was seen that the holes were too high. Others were drilled lower, and after 15 tons of coke and 1 ton of reheating furnace slag had been thrown in, the shots were fired. The scaffold was now thoroughly broken, the charge settled uniformly, and after 24 hr. iron was delivered to the steel works.

In regard to explosives, if dynamite is used and the gun tube has become very hot in the furnace, it should be cooled before pushing in the loaded tube, by introducing a hose for water cooling. Otherwise the nitro-glycerine may melt, explode, and blow out the tube. All of the so-called safe handling explosives can be used either in powdered form or gelatinous. In France and Belgium, cheddite, macarite and sabulite have been used with success. A good explosive can be made if necessary from nine parts potassium chlorate and one part petroleum. With this a strong container must be used, and 1 to 1¼ kg. as a charge. It must be at least 12 in. from the brickwork.

G. B. W.

Corrigan, McKinney & Co., Cleveland, Ohio, have placed the following orders in connection with the erection of their new steel plant and blast furnaces: Three horizontal cross-compound blowing engines, Mesta Machine Company, Pittsburgh; 10 stokers for 825-hp. boilers, Green Engineering Company, Chicago; 100 charging box buggies and ingot mold cars, United Engineering & Foundry Company, Pittsburgh.

Railroads Granted Five Per Cent. Advance

"Increased Hire of Capital" a Factor—Coal, Coke and Ore Excepted —Increased Buying of Steel Likely

WASHINGTON, D. C., December 22, 1914.—Announcement was made December 18 that by a vote of 5 to 2 the Interstate Commerce Commission had decided to grant the petition on rehearing of the railroads in official classification territory for a 5 per cent. advance in rates, excepting rail-lake-and-rail, lake-and-rail, and rail-and-lake rates, commodity rates on bituminous coal, coke, anthracite and iron ore, and rates governed by unexpired orders of the commission. Commissioners Harlan and Clements dissented.

The decision, which it is estimated will swell revenues at least $30,000,000, is a notable victory for the carriers, the full effect of which in its material and psychological influence upon the business of the country will hardly be overestimated. The commission states that the reason coal, coke and iron ore have been excepted from the increase is that they are under review in other proceedings. As to the exclusion of the joint rail and water rates from the increase, it is doubtless true, as pointed out by the commission, that since the rail carriers acquired ownership and control of the lake lines successive increases have been made in the rates via lake tending to lessen the differences between them and the all-rail rates, and it must also be remembered that during the entire period of closed navigation the carriers will enjoy the full advantage of the new tariffs.

Totally disregarding the contentions of Mr. Brandeis, special counsel for the commission, the majority opinion unequivocally declares that the financial problems of the carriers have been "made much more acute" by the great foreign conflict and that consideration must be given "to the increased hire of capital as well as to other increased costs."

The decision as a whole cannot fail to prove most helpful to the iron and steel industry. The new tariffs become effective 10 days after they are filed. The railroads will now be able to place deferred orders for rails, rolling stock, bridge material, supplies, etc., aggregating many millions of dollars, while as consumers of coal, coke and ore the iron and steel producers, for the present at least, will not be called upon to bear any part of the burden imposed on the shipping public by the increased rates. Some extracts from the decision are as follows:

RAILROAD BUYING UNDULY RESTRICTED

"While there has been recently an enlarged expenditure for maintenance of equipment, it is clear that it has not been sufficient to restrict to proper limits the number of cars and locomotives needing repairs. The carriers in the past have not known how large an expenditure to figure upon for the maintenance of the newer type of steel freight cars, and appear now to have discovered that such expenditure must be greater than was anticipated. The like may be said as to the recent enlargement of expenditure upon roadway. We cannot view with favor any attempt to obtain an increase in net revenue through unduly restricted expenditures upon maintenance.

"To whatever extent recent increased provisions for depreciation or expenditure for maintenance may militate against a fair comparison of supposedly comparable statistical items for various years, we cannot say on this record that such charges as at present returned by the carriers are excessive, viewed either from the standpoint of proper accounting or of safety of operation.

"The testimony shows that while some maintenance is being deferred, other maintenance deferred during the last fiscal year is now being made, and that the expenditure therefor during the months of July and August measured up to the level of recent years. The testimony also shows that transportation expense is being reduced through the laying off of employees and cancellation of train service.

THE WAR AND FUTURE FINANCING

"The conflict in Europe will doubtless create an unusual demand upon the world's loan fund of free capital, and may be expected to check the flow of foreign investment funds to American railroads. It appears that our railroads represent the bulk of European investment in this country. The rate of interest—the hire of capital—has risen during the last decade and may rise still further. It is computed that in the years 1915, 1916 and 1917 the carriers in official classification territory must arrange for the payment or refunding of securities aggregating over $500,000,000. True, the representations of the carriers in the 1910 cases that without the increase then sought their credit must totally vanish proved strangely at variance with their subsequent experience in the borrowing of many hundreds of millions. But we do not doubt that the financial problems of the carriers have been made much more acute by reason of the war; and if we are to set rates that will afford reasonable remuneration to those carriers, we must give consideration to the increased hire of capital as well as to other increased costs.

"While we differ as to the relative importance to be attached to the various considerations presented, we agree in the conclusion that, by virtue of the conditions obtaining at present, it is necessary that the carriers' revenues be supplemented by increases throughout official classification territory. Whatever the consequences of the war may prove to be, we must recognize the fact that it exists, the fact that it is a calamity without precedent, and the fact that by it the commerce of the world has been disarranged and thrown into confusion. The means of transportation are fundamental and indispensable agencies in our industrial life and for the common weal should be kept abreast of public requirements.

VARIOUS JOINT RATES ADVANCED

"The original report, besides approving a rate increase in central freight association territory, suggested 10 sources of additional revenue for all carriers throughout official classification territory; the present report, recognizing the existence of a new situation since July 29, acquiesces in a territorial extension of the relief granted to the central freight association lines by permitting the carriers to file tariffs providing, with certain exceptions specified herein, for horizontal rate increases in official classification territory. It is expected that the constructive work suggested in the original report for the purpose of conserving and augmenting the net revenues of the carriers generally will be carried forward without interruption.

"In our original report we declined, for reasons there stated, to allow increased rates in central freight association territory on cement, starch, brick, tile, clay, and plaster. On further consideration, in the light of the existing situation, these rates may be increased throughout official classification territory under the limitations herein set forth.

"Joint rates between official classification territory on the one hand, and southeastern territory, the southwest and points on or east of the Missouri River on the other, may be increased not to exceed 5 per cent. of the division of the rate accruing to the carriers in official classification territory. If these increases involve a change in the relationship under the long-and-short-haul rule, between intermediate points and more distant points outside of official classification territory relief from the fourth section of the act must first be secured on regular application.

"Interstate rates to and from New England from and to points in trunk line or central freight association territory, where necessary to preserve established relationships between points or ports in New England and points or ports in trunk line territory, may be increased not to exceed 5 per cent.

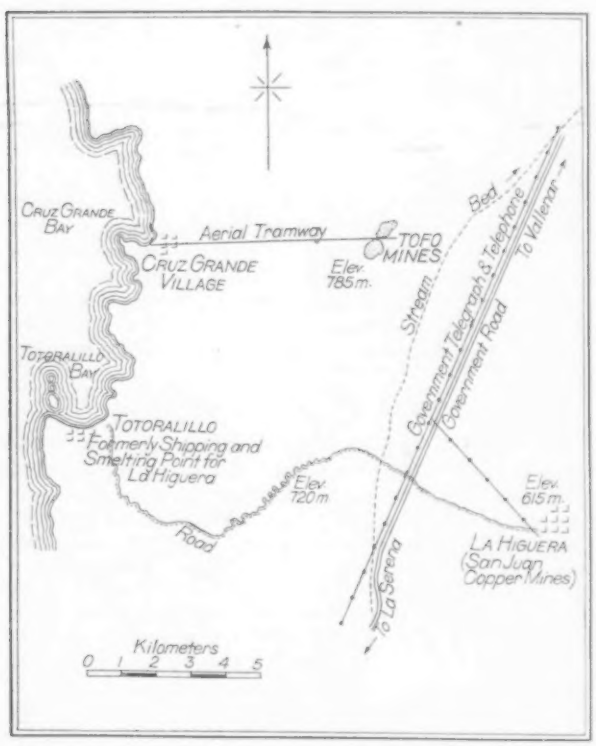
"Subject to the maintenance of the established Atlantic port differentials, rates to and from New York may be increased not to exceed 5 per cent. and rates to and from Portland, Boston, Philadelphia and Baltimore may be increased to the extent necessary to maintain said differentials." W. L. C.

Operations at the Tofo Iron Mines in 1914

The Bethlehem Steel Company's Progress at Its Chilean Property—Electric Railroad from Mines to Dock

Shipments amounting to 63 000 tons have been made from the Bethlehem Steel Company's Chilean iron mines at Tofo in the past year, two-thirds of the amount coming to the United States. Contracts for dock and railroad construction have been let and for the extensive electric plant required for the operation of the railroad.

As has been indicated in previous articles the Tofo mines are located near the coast of Chile, about 30 miles north of Coquimbo. They were originally opened in a small way by a French company, which also operated a steel works at Corral in southern Chile. The



Map Showing Location of Tofo Iron Mines and Cruz Grande Bay Where Docks Will Be Built

Bethlehem Steel Company, through its subsidiary, the Bethlehem-Chile Iron Mines Company, took over the property in 1913. Hubert Merryweather, formerly with the Juragua Iron Mines Company, a Cuban operation also owned by the Bethlehem Steel Company, is vice-president and general manager.

The surroundings of Tofo are shown on the accompanying map. A general description of the mines was published in *The Iron Age* of May 11, 1914. Operations have proceeded steadily at these mines during the year, the handicap due to the general disturbance caused by the European war being to a great extent neutralized by the abundance of labor now available in Chile. Ordinarily the labor question there is a serious one, but due to the closing of many nitrate operations, labor in all parts of Chile is now very plentiful.

Exploration work by means of tunnels has been carried on, and ore reserves have been materially increased. Much ore has also been put in sight in some cuts made in road construction. Tunnels are now in ore at a point 150 meters, or 490 ft., below the top of South Hill. It was thought that possibly this ore from the lower part of the ore-body might show some increase in sulphur content, but this has not been the case. Thus a sample from the lowest tunnel analyzed as follows:

Iron	67.47 per cent.
Manganese	0.12 per cent.
Phosphorus	0.008 per cent.
Sulphur	trace
Silica	2.00 per cent.

Some exploration tunnels in the mantle of float ore on the eastern edge of the deposit have materially increased the tonnage of float ore in sight.

Shipments of ore have continued during the year as conditions permitted. The ore shipped has been transported to Cruz Grande by aerial tramway, and loaded into vessels by a cantilever loading bridge. This cantilever has now been fitted with a conveying belt 36 in. wide, replacing the buckets as installed by the French company. It is expected that this will greatly reduce the loading time and correspondingly expedite shipments.

SHIPMENTS IN 1915 TO BE 200,000 TONS

The year's shipments to Philadelphia were six cargoes, aggregating 42,000 tons, and to Europe three cargoes aggregating 21,000 tons, making a total of 63,000 tons. The ore consigned to Europe was to fill some contracts entered into by the French company. Three of the cargoes consigned to the United States came through the Panama Canal, the Oldfield Grange being the first to use the waterway for the purpose of bringing iron ore to the United States.

A typical cargo analysis (natural) of the ore is as follows, the cargo selected being that of the steamship Twickenham:

Moisture	0.10 per cent.
Iron	67.60 per cent.
Phosphorus	0.043 per cent.
Silica	2.21 per cent.
Copper	0.009 per cent.

It is now hoped to ship 200,000 tons in 1915, and to gradually increase this amount until the permanent installation is completed, when a production of 1,500,000 or 2,000,000 tons annually is expected.

A very important feature of the year was the development of a water supply. In 1913 water rights were acquired of the San Juan group of copper mines at La Higuera, and an abundant source of water has been developed. From old records it is expected that ultimately there will be available about 300,000 gal. per day. An electric pump has been installed, a pipe line laid to Tofo, concrete storage tanks erected, and the water is now in use. It has been found to be of a satisfactory character, though containing a rather high

percentage of calcium sulphate. A water treatment plant will shortly be installed to insure a quality for boilers and drinking purposes. It was found that the water that had stood in the San Juan workings for years contained practically no copper.

DOCK AND RAILROAD CONSTRUCTION

A contract has been let to the Snare & Triest Company, New York, for installing a basin dock in the bay of Cruz Grande. The basin will be excavated approximately 40 ft. deep, 200 ft. wide and 900 ft. long. It is in the form of a slip, where the boats can enter for the loading of iron ore. At one side will be erected a steel dock 340 ft. long. This will have pockets holding 30 000 tons of iron ore, and loading will be through chutes by gravity, permitting the loading of a boat in a very short time. The dock will be similar in construction to many of the ore docks in service on the Great Lakes. The railroad tracks on top of the dock are at an elevation of 123 ft. above low tidewater, and the railroad running from the mines will approach this dock from a higher elevation, and will not require any up-grade hauling of the ore.

A contract has been made with Slaughter & Ross, of Chile, for the construction of a railroad which will transport the ore from the mine to the dock. The main line will be about 15 miles long, of which 13 miles will be of a uniform 3 per cent. grade, the remaining 2 miles varying from level track to a 2 per cent. grade. A 3 per cent. grade was considered the maximum grade that should be used, in view of the heavy trains that will be operated. The mine has an elevation of about 2300 ft. above sea level, and is on a direct line about 4 miles from the dock at the Bay of Cruz Grande. It is necessary to make a railroad of the above length in order not to get a grade of over 3 per cent. The railroad will be standard gauge, 4 ft. 8½ in., with 100-lb. rails, tie plates, oak ties, rock ballast, etc. It will be single track, and have four passing sidings, each 1050 ft. in length. The country through which it is built is rough, mountainous, and principally rock. Approximately 50 per cent. of the road will consist of curves, the sharpest being about 350 ft. in radius. There will be no tunnels or bridges, but a steel double track trestle will be built for an approach to the dock.

ELECTRIC PLANT FOR THE RAILROAD

The railroad will be electrically operated, having a catenary overhead trolley system which will furnish direct current at 2400 volts to 110-ton electric locomotives. The total weight of the locomotives will be on the drivers. The locomotives will have a continuous tractive effort of about 37,000 lb. at 11 miles per hour, which will permit of hauling a train of 21 ore cars of 420 tons total weight up the 3 per cent. grade in continuous service. The most interesting feature of the electric locomotives is the regeneration of power when they are descending the grade with loaded trains. The power thus generated will be sent back into the lines to assist in hauling the empty cars up the 3 per cent. grade. This regeneration also reduces the duties on the air brake system in retarding the descending trains.

At the Bay of Cruz Grande, a modern steam turbine electric power plant will be built. The General Electric Company, Schenectady, N. Y., has the contract for the installation of the apparatus for this plant, as well as the electrification of the railroad. There will be two steam turbines, each of 3500 kw. capacity, which will generate power at 2300 volts, 3-phase, 60-cycles alternating current. The auxiliaries of the steam turbines will be motor driven—circulating water pumps, vacuum pumps, hot well pumps, and boiler feed pumps. The boiler equipment will consist of four boilers of 440 hp. each. They will generate steam at 200 lb. pressure and 100 deg. F. superheat. Oil will be used for fuel, although the boilers will be constructed so that coal can be used if desirable. A 300-kw., 600-volt, 60-cycle, 3-phase alternating current turbine will be used to provide power for the station auxiliaries, and to supply power for the load at night, which will be principally lighting and of small capacity. Power will be transmitted to the mine from the power house by a 22,000-volt transmission system, which will consist of two duplicate transmission lines on the same poles. Two banks of transformers, consisting of three single-phase transformers per bank, will be used in the power house and also at the mines for changing the voltage from 2300 to 22,000. Each bank of transformers will be connected in delta on the primary and secondary windings; each will have a capacity of 2000 kva. Power will be furnished the railroad by two motor generator sets located in the power house. Each set consists of a 1400 kva., 2300-volt synchronous motor, direct connected to two 500-kw., 1200-volt d.c. generators connected in series, so as to give 2400 volts d.c. with a capacity of 1000 kw. normal load.

ELECTRICITY FOR SHOPS AND MINES

The machinery in the machine and blacksmith shops will be motor operated. The large ore crushers at the mines will be driven by electric motors. The crushing plant will consist of a large 5 x 7-ft. jaw crusher, working in conjunction with two No. 9 gyratory crushers. The drills for mining purposes will be electrically operated.

On account of the comparatively high cost of fuel in Chile it is more economical to produce power in the main central station, and to use electrically operated apparatus wherever possible, instead of having apparatus operated by steam from small isolated boiler plants which have a poor fuel economy. For this reason the mining and transporting of the ore will be done by electrical apparatus wherever it is possible.

German Iron and Metal Trades

The following data from European journals cover various phases of war conditions in German industries:

Steel works in Upper Silesia are operating at about 60 per cent. of capacity. Little demand for bars and plates is reported, but light sheets are brisker. Makers of tubes are busier, though there is keen competition there from Westphalian plants. The pig-iron production in Upper Silesia in October was 60,736 metric tons, an increase of 11,414 tons over September, and the total output to November 1, 1914, was 737,254 tons, or 97,275 less than for the same period last year.

New construction reported: The Thyssen Steel Works are erecting a new rail mill at Hagendingen. The Rombach Works are completing their eighth blast furnace and are about to extend their rolling mills. The Aumetz-Friede Works at Kneutingen plan the erection of a cement plant, while the De Wendel Works are said to be building a new steel plant at Hayingen. A new plant is contemplated by the Dillingen Iron & Steel Works.

The Wurtemburg group of the Association of Iron Foundries has raised the price of castings 10s. ($2.43) per ton.

At the last meeting of the Pig Iron Syndicate, November 23, it was decided to continue present quotations for the first quarter of 1915 with the exception of hematite, which is raised 10s. ($2.43) per ton, because of the advance in hematite ores. Two or three days later it was announced unofficially that it had been decided to again introduce a bounty of 5s. 6d. ($1.34) per ton on pig iron used in export manufacture. The output in November was expected to reach that of the two previous months.

An advance of about 70 per cent. in the prices of old metals has taken place and maximum selling prices are proposed by the Government for these as well as for new metals, including tin.

As a result of the dissolution of the International Spelter Syndicate, it is contended by certain members that the German Association is to be regarded as dissolved. Other members contend that contracts are not rendered void by the war but merely suspended. The matter may be contested at law. Efforts are being made to reorganize the German Spelter Syndicate on a different basis.

The Austrian Steel Syndicate's domestic sales in October decreased 8641 metric tons or 23 per cent., compared with those of October, 1913.

ESTABLISHED 1855

THE IRON AGE

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The Advance in Freight Rates

It took the greatest calamity that has fallen upon the world to convince the Interstate Commerce Commission that there can be a situation in American railroad financing serious enough to justify a practically general increase in freight rates. For the 5 per cent. advance granted the Eastern roads will also be given to the Western lines, it may be assumed, on a similar putting of their case. Nothing in the decision, however, indicates that the majority of the commission have changed their minds on the proposition that their main function is to reduce freight rates or hold them where they are. The conditions produced by the war, their effect upon the "hire of capital," and the unparalleled dislocation of the world's financing are the sole grounds on which action is now taken which was refused four months earlier.

At the same time it cannot be doubted that the remarkable events of these late months have brought a change of heart to some members of the commission on one matter, and that is the right of the public to make its wishes known concerning a question so vitally affecting the prosperity of the whole country. In its former opinion the commission attempted to rebuke the organized effort to get before it the extent to which the plight of the railroads was affecting business in many important lines. The "clamor" from the same sources has been redoubled since the case was reopened, but the commission refrains from being affronted. It has not missed the fact, and should not miss it, that government by commission is being seriously weighed in the balance.

The decision will do a vast amount of good to business, just as the refusal of relief would have wrought incalculable harm. All that is said about the war's effects was well known four months ago, and the country would have been in far better condition to-day had the railroads been able to make preparations to buy in early fall. Their financing had come to an impasse. Now, at last, there is a way out. The steel trade sorely needs railroad orders, and while they are not likely to come after the manner of a bursting dam, they promise to be sufficient to give a considerably better scale of operations on rail, plate, structural and bar mills before the new year is many weeks old. Car buying in 1914 has been less than half the average for the past ten years, being under 100,000, while locomotive orders—approximately 1000—have been less than one-fourth the average for the same period. That represents a rate of replacement inadequate to the needs of simple maintenance, and the Commerce Commission rightly says that the risks of neglect in this direction must not be taken.

The decision as it stands, and with all the reluctance of the commission to give it, is worth more to the railroads than can be set down at the moment. It means that proposed advances in railroad wages or compulsory increases in crews carry with them the definite possibility of an added charge to the buyer of transportation. At fearful cost the demonstration has been made that there is no railroad strong box out of which higher and yet higher wages can be paid, and that freight rates are not an iron ring which may contract but under no conceivable conditions may expand.

A Time to Build

Manufacturers in all lines have had reason to know that building and equipment prices are exceedingly low. It is naturally expected that municipal and other public work will be undertaken under such conditions as have existed for months, and some trades have benefited from public contracts, but by no means to the extent needed for taking up the slack everywhere in evidence. The cast-iron pipe trade has had some help from municipal activity, but the demand upon it has not approached its capacity, and with the low bids on city work before them private buyers have secured prices that were pretty largely of their own making. Buyers of steel for structural work have found a like eagerness by steel makers and fabricators, bidders going below cost to get a job that would save their shop from a more expensive idleness.

As long as the European war lasts it is to be expected that conservatism will govern the action of manufacturers in this country; but it is unwise not to consider also what will come from the ending of the war. That may be a year hence or only a matter of months, but with it will come a marked revival of trade. The next forward movement in the iron and steel and machinery trades is likely to find a good many manufacturers unprepared to meet it. That was the case in 1899 and 1900, when the panic of 1893 was a little less distant than the present is from the panic of 1907. It was the country's unpreparedness for the business that poured in upon the steel companies at the close of the nineties and for two or three years following that sent prices up so far that the great consolidations actually capitalized the profits and prosperity of the time.

Leaving the war out of account, there has been

in this country for many months a low scale of operations in scores of lines, consumption falling much below the average, while stocks everywhere have been reduced below what is called for by mere up-keep. The low prices of 1914 have only here and there been taken advantage of for the putting through of extensions by manufacturers in the metal working trades. Money is now to be had at reasonable rates. Contractors and manufacturers of material in every construction line are making the lowest prices in years, and companies which have long been conserving their resources find in the present situation an opportunity that does not often come. It would only be following the precedents if the distinctly greater activity in iron and steel looked for with the coming of spring has as one of its leading features the new construction that has been stimulated by unusually low prices.

A Lean Year's Distribution of Steel

With our monthly blast furnace returns completed for five months of the second half of this year it is safe to estimate the country's pig-iron production in this half year at 10,700,000 to 10,750,000 gross tons. As the first half production was officially reported at 12,536,094 tons, the year's total promises to be 23,250,000 or 23,300,000 tons, so that the year will fall below the lean year 1911 by a few hundred thousand tons, will surpass the altogether exceptional year 1908 by over 7,000,000 tons, and will otherwise be the smallest year in pig-iron production since 1905.

The decrease from 1913, the banner year to date, is 25 per cent. It does not follow that the production of the various descriptions of finished steel has suffered in anything like the same proportion. The case of tin plate is an extreme one, for the tin plate demand is an outlaw, and the production in 1913 was 14 per cent. less than in 1912, whereas pig iron, as well as steel generally, increased somewhat in tonnage. The production of tin plate this year is estimated at 900,000 gross tons, or midway between the production in the two preceding years, thus showing a measurable gain over 1913, while pig iron falls off 25 per cent.

Distinctly in the other category is the item of rails, for rail production last year was 3,500,000 tons, while for this year the production is estimated at less than 2,500,000 tons, perhaps at little more than 2,000,000 tons, indicating a drop of probably much more than 30 per cent.

The production of sheets has probably suffered considerably less by comparison with 1913 than did the production of pig iron; but as was the case with tin plate, 1912 and not 1913 was the record year for sheets.

Such staples as wire and standard steel pipe have suffered relatively little in tonnage demand in the past year, but the pipe industry in general has shown a very considerable recession in activity, because of the great decrease in demand for line pipe and oil-country goods.

The view is frequently expressed that in a lean year the production of all heavy lines suffers the greatest decrease. Invariably this is the case with rails, but it is not always the case with plates and structural shapes. It is true that plate consumption has been very seriously affected by the limited demand for steel cars, but this decrease was also felt to an extent in 1913. The decrease in the number of cars ordered has been less from 1913 to 1914 than it was from 1912 to 1913. It must be remembered that there have been some large projects in the past year. For the New York subway, for instance, 200,000 tons of steel of various descriptions has been ordered in the current year.

Taking the 25 per cent. decrease in pig iron from 1913 to 1914 as standard, it may be concluded that the final statistics will show a much larger decrease than this in rails, a slightly greater decrease than 25 per cent. in plates and shapes, about 25 per cent. decrease in merchant bars and skelp, and much smaller decreases in wire and sheets, winding up with an actual increase in tin plate.

While the character of our iron and steel exports has changed greatly since the war started, the total tonnage involved has not been sufficient to affect materially the total production in the different lines. The changes, moreover, have been as much in destination as in the description of goods. For instance, while much has been made of exports of wire products to the allies in the war, the point has sometimes been neglected that we have lost very greatly in wire exports to South America and other neutral countries.

Schemes of Export Sharpers

A natural result of the widespread interest in the extension of our foreign trade is the large increase in so-called exporting experts in this country. The majority of the new export agencies established are doubtless endeavoring to do a strictly honest business and to give value received in all of their transactions. These should have the hearty support of American manufacturers.

But there is a class of charlatans that has suddenly sprung up whose operations should be emphatically and quickly curtailed. An example of the frauds practiced by these self-styled exporting experts is the sale of a list of prospective customers in South America or elsewhere, all of whom are claimed to be personally known to the vendor of the list. A foreign accent, coupled with the bold assertion that the interviewer speaks several languages, is generally sufficient to bring the manufacturer's check book into service.

A typical instance may be cited in the attempt of a professed export adviser to sell such a list for $100 to a manufacturer known to be desirous of extending his foreign business. This list, it was ascertained, was copied from a well-known directory of 1911, and it was only by accident that the manufacturer was saved this investment as well as considerable trouble and expense in sending out advertising matter to firms, some of which probably have gone out of business.

Fortunately, the majority of the American exporting houses and agents are honest in their efforts to extend the export trade, and they should join hands with the manufacturers in exterminating the incompetent and ofttimes dishonest minority, whose schemes are likely to discourage the one who is making his first trial at export business.

Foreign languages, to most American manufacturers, are a stumbling block in more ways than

one, in their efforts to establish an export trade. The inexperienced who desire to exploit the export field too frequently intrust their interests to a mere linguist, bent on selling questionable lists at a high price or on securing advance money for a trip to South America to sell machine tools, when probably he does not know the difference between a planer and a shaper. Spanish America offers an inviting market, but if unnecessary losses are to be avoided, care should be exercised in the steps taken to secure knowledge of probable buyers and proper representation.

The attention of manufacturers is also called to sharpers who are now operating in the guise of purchasing agents for foreign governments. This is a business which is often clouded with secrecy and therefore presents an excellent opportunity for fraudulent practices. A buyer should be able to present some credentials showing his authority, even though not disclosing his exact principals. It is well to be wary of the man who is too willing to be entertained.

Engineering Society's Service Scored

An inquiry is being attempted into the management of the American Society of Mechanical Engineers. Members have lately been circularized by one of their own number. The questions asked intimate that the individual member, particularly the non-resident member, does not have the conveniences at the headquarters in New York, either socially or professionally, to which he is entitled. The matter is one for internal adjustment, but the fact that disturbing correspondence of this sort can be successfully started indicates that there are weaknesses in the management which are likely also to exist in other organizations. It is usually easy to engage in a disruptive campaign, but it commonly centers upon relatively unimportant shortcomings, apparent or existing, and interferes too seriously with the worth-while activities of the organization. It would be well therefore for the executives of all similar associations to note the specific allegations of the present case to see if there is need of correctives in their own individual cases.

A superficial investigation in the case of the American Society of Mechanical Engineers does not indicate that there is justification for the present eruption. All the facilities which are suggested as wanting have been provided and have been utilized in most cases for some years, but the management has apparently not made these facts as patent as it might have done to the rank and file of the membership, and this has given plausibility to the campaign of inquiry and is the weakness in management to which attention is called. It would seem that the executives must figuratively take each member by the hand and explain to him at length what has been provided for him. If he has read of the arrangements which have been made for him he has probably forgotten them and they need reiteration. It is probable that if the management will properly make its position clear, the temporary agitation will do a lot of good, without allowing for any individual advertisement, as some are unkind enough to say is a leading motive behind the inquiry.

No General Reduction of Wages by the Steel Corporation

The discussion of possible wage reductions by United States Steel Corporation subsidiaries at a meeting of the presidents of these companies in New York last week developed opposition to such a step, though there was no dissent from the view that the conditions which had caused the reduction of dividends and the use of surplus were the most serious the trade has faced. The matter came up at the meeting of the Finance Committee of the Corporation held in New York Tuesday, December 22, and after its adjournment the following statement was given out by Chairman Gary:

"After giving careful consideration to the subject, it has been decided to make no general reduction in the wages of the employees of the United States Steel Corporation at this time. There will probably be some readjustment in the amounts paid for skilled labor or piece work, depending upon special conditions.

"In view of the general depression in business which has been experienced for some time, decreases in the general wage scale have seemed inevitable and imminent; but it has been determined to continue the existing scale for the present, at least, with the hope that improvement in business will be realized. Already there are some evidences of a change for the better."

The granting of 5 per cent. increase in freight rates to the railroads was an important factor in the final decision announced above, and it is influential in like manner in the consideration that is being given to the question of wage and salary reductions by a number of independent steel companies. That some tonnage rates would be reduced in view of the low prices of steel products has been considered inevitable, but these rates apply to a relatively small percentage of the total number of steel works employees.

Kentucky Compensation Act Invalid

The Kentucky workmen's compensation act, which was to have become operative January 1, has been declared unconstitutional by the State Court of Appeals. The decision was of wide interest, inasmuch as the act affected all manufacturers employing six or more men. The principal grounds for the action of the court, which divided on the question, 4 to 3, were that the law violated the constitutional provision that no limit may be placed on amounts recoverable for personal injuries and that, while entering the compensation system was made optional, the election of employers and employees was surrounded with so many conditions that it amounted to coercion. As it is likely, in view of the decision of the court, that a constitutional amendment will be needed before another law can be enacted, it is certain that Kentucky will have no such legislation for a number of years.

American Steel Company Buys Coke Plants

The American Steel Company, Park Building, Pittsburgh, bought last week at receivers' sales the Cyrilla and Francis No. 1 plants of the Sunshine Coal & Coke Company, located in the Connellsville region near Uniontown, Pa. Both plants, which are completely equipped but have been idle for a long time, will probably be put in operation soon after January 1. The Cyrilla plant, located at Lynn Station, Redstone Township, comprises about 180 acres of Pittsburgh coal, 157 acres of surface, 142 beehive ovens, power plant, workmen's houses, etc. The Francis No. 1 plant, located at Martin, Nicholson Township, includes 120 acres of Pittsburgh coal, 330 acres of Sewickley coal, 475 acres of surface, 240 beehive ovens, power plant, workmen's houses, etc.

BRITISH EXPORTS OF STEEL

War Material Not Counted, so That Statistics Are Not a Guide

Great Britain's iron and steel exports for the first 11 months of 1914 show a decrease both in tonnage and values from 1913, the decrease ante-dating the breaking out of hostilities. The total sent abroad to December 1, 1914, excluding iron ore and scrap, was 3,698,631 gross tons against 4,570,637 tons in the first 11 months of 1913, a decrease of 872,006 tons. The falling off in values was £10,835,423, or from £50,208,580 to £39,373,157. In pig iron, including ferroalloys, the decrease in exports was 301,696 tons, the total to December 1, 1914, being 748,986 tons against 1,050,682 tons. Exports of ferromanganese in November were about 9000 gross tons as compared with about 12,000 tons in November, 1913, the effect of the embargo in the second week of the month not being extensive. The exports of galvanized sheets were 544,261 tons or 156,279 tons less than for the first 11 months of 1913.

Imports of iron and steel, excluding iron ore and scrap to December 1, 1914, were 1,557,243 gross tons against 1,997,036 tons to December 1, 1913, a decrease of 439,793 tons. The values for these two periods were £10,367,652 and £13,764,919 respectively, a decrease in imports of £2,397,267 as compared with last year. Imports of iron ore in November were 353,767 gross tons or about 20,000 tons in excess of November, 1913.

Figures for the first four months of the war, compiled by the London Iron and Coal Trades Review, show exports of manufactured iron and steel, exclusive of iron ore, scrap, pig iron and ferromanganese, to be as follows:

	1914, Gross tons.	1913, Gross tons.	Dec. from 1913, per cent.
August	183,000	295,000	38
September	192,000	289,000	34
October	216,000	336,000	36
November	158,000	319,000	41

Editorial comment on these figures by the same paper is as follows: "November is on the above showing the most unsatisfactory month yet experienced. However, we know perfectly well that the iron and steel trade is on the whole extraordinarily busy. The sheet industry—black galvanized and tinned—has been the backbone of our export trade in iron and steel, and these descriptions alone show a drop of 65,000 tons in November compared with those of the same month in the previous year. If we deduct these from the remainder the percentages are not so unsatisfactory, especially as the latest American figures, for instance, show a drop of 55 per cent. At the present moment, however, the Board of Trade returns cease to be of much value as an index of the foreign trade of the country. War material is excluded, and any firm that can roll a 3¼-in. round or can turn a 3-in. shell can get all the business it wants. The orders pouring into this country for war material of all descriptions and the machinery and plant wherewith to make it much more than compensate for the apparent loss of export trade. We have to make good in a few months the lead which the Germans have secured in war material in the same number of years, and a few of the neutral countries are apparently thinking that it is to their advantage to do the same."

The Debevoise-Anderson Company, 56 Liberty street, New York, will open a New England office on January 1, in the Exchange Building, Boston, to be in charge of C. A. Wyatt, formerly of Rogers, Brown & Co. It will handle pig iron from the Buffalo district as well as from eastern Pennsylvania and Virginia furnaces, also extending its business on the highest grades of foundry, smelting and crushed coke.

The MacArthur Concrete Pile & Foundation Company, 11 Pine street, New York City, has appointed Waldo Brothers, 45 Batterymarch street, Boston, Mass., its sales agents for New England.

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American Iron and Steel Institute Members

At the meeting of the directors of the American Iron and Steel Institute in New York, Friday, December 18, the following were elected to membership:

Active Members

John B. Cartwright, superintendent of mines, Lyon Mountain, N. Y.

Edgar W. Clarke, chief engineer Cambria Steel Company, Johnstown, Pa.

Edwin E. Ellis, assistant manager land department, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.

Richard B. Hickman, president Ewald Iron Company, Louisville, Ky.

Harry B. Weaver, treasurer and manager Allentown Iron Mfg. Company, Allentown, Pa.

Associate Members

John S. Albert, Pittsburgh Representative of Southwork Foundry & Machine Company, Pittsburgh.

David Baker, consulting engineer Broken Hill Proprietary Company, Ltd., Newcastle, N. S. W.

John Z. Collier, sales engineer William Tod Company, Youngstown, Ohio.

Edwin Horton, tin plate manufacturer and inventor of rolling mills, New York.

William C. Prendergast, vice-president John C. Vance Iron & Steel Company, Chattanooga, Tenn.

Richard L. Rathbone, sales engineer Westinghouse Electric & Mfg. Company, Cleveland, Ohio.

William Lawrence Saunders, chairman of the board, Ingersoll-Rand Company, New York.

Stuart Wells Utley, vice-president and manager Detroit Steel Castings Company, Detroit, Mich.

The Iron and Metal Markets

OUTLOOK MORE FAVORABLE

Freight Advance and Wage Maintenance

Both Factors in an Improved Situation, Though Prices Have Suffered

The 5 per cent. advance in the rates of Eastern railroads and the closely related decision of the Steel Corporation to make no general reductions in wages are important reinforcements of the favorable factors in the steel market. The railroads have not hastened to buy steel, but already there are well authenticated reports of requisitions that are being made ready for January. December has seen some activity in track supplies, but rail orders from two important trunk lines are pending, and Western roads are expected to furnish some good-sized winter rollings.

The Steel Corporation decision on wages is expected to bring out orders from a good many manufacturing consumers who have looked for lower prices in case of general reductions of mill costs. One strong argument against wage cuts, in fact, was that they would at once be given away in the market. Whether the sentiment created by wage maintenance will take shape in firmer prices remains to be seen.

In new buying December has shown a marked improvement over November. The Steel Corporation reports nearly twice as much new business this month as in the corresponding period of November, and it will close the month with a substantial gain in orders on the books.

There is general complaint among steel manufacturers, however, at the course of prices. Increased business has been won for the most part by concessions and the quiet fortnight at the end of the year has now come in, putting over into the early weeks of 1915 the threshing out of the effort of some sellers to stiffen the market on plates, shapes and bars.

Thus far 1.05c., Pittsburgh, on these three important products has been limited almost entirely to early delivery business with accompanying specifications, and most of the contracts for the first quarter have been based on 1.10c. The elimination of 1.05c. prices at the opening of the year is one of the predicted results of the favorable developments of the past week.

Some inquiries for cars have come up and the Illinois Central is expected to come into the market for 2000. The purchases of the week for four lines amount to 1050. Chicago reports increased inquiry for track fastenings, one road asking for 20,000 kegs of spikes.

Chances seem to favor German mills in the case of the Norwegian inquiry for 27,000 tons of rails, on which a number of domestic makers put in bids.

Apart from the better car business now looked for, plate mills are getting encouragement from the prospect of an active campaign of vessel building. Figuring with Eastern shipyards has been extensive and the outlook for the Lake yards has improved. At Detroit contracts for five vessels have been taken which will require 10,000 to 12,000 tons of plates. The Standard Oil Company's contract is still pending. It may be 10,000 tons for the first half, or 20,000 tons for the whole year. In the past week one Eastern mill sold 8000 tons, including 4000 tons for a Standard Oil tank steamer.

Demand for structural steel is still insufficient to stiffen prices. One Central Western contract went at $32.50 for fabricated steel. A structural order from Greece calls for 5000 tons, and a 6000-ton award for Toronto viaduct work has gone to a Canadian plant.

Western implement works have generally covered for bars for the first half of next year on a 1.10c. basis. In hard bars there has been some cutting to 1.02½c., Pittsburgh. Recent low prices on iron bars have brought out a good many inquiries at Chicago, ranging from 1000 to 7000 tons, but the mills are not willing to tie up at these prices now that prospects are brightening.

Foreign inquiry for barb wire has grown in an astonishing way, and Pittsburgh reports that mills are bidding on more than 100,000 tons. One maker is now shipping abroad fully 25 per cent. of its output.

Pipe works have done most of the pig iron buying of the week, Alabama iron figuring largely. No. 3 foundry iron has sold at $9, Birmingham, and there are indications that $9.50 is not minimum for No. 2. Recent pipe works purchases have probably exceeded 75,000 tons.

In eastern Pennsylvania fair-sized sales of basic and low-phosphorus irons have been made lately, the former at $13.50 delivered.

In general the pig iron market is quiet and weaker prices on Southern iron are not helping the efforts of some Northern makers to get advances.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month, and one year previous.

	Dec. 23, 1914.	Dec. 16, 1914.	Nov. 25, 1914.	Dec. 24, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia....	$14.25	$14.25	$14.50	$15.00
No. 2, Valley furnace...	12.75	12.75	12.75	13.00
No. 2 Southern, Cin'ti....	12.40	12.40	12.90	13.75
No. 2, Birmingham, Ala..	9.50	9.50	10.00	10.50
No. 2, furnace, Chicago*	*12.75*	13.00	12.50	14.00
Basic, del'd, eastern Pa..	13.50	13.50	14.00	14.25
Basic, Valley furnace...	12.50	12.50	12.40	12.75
Bessemer, Pittsburgh....	14.70	14.70	14.70	15.90
Malleable Bess., Ch'go*..	*12.75*	13.00	12.75	14.50
Gray forge, Pittsburgh...	13.40	13.40	13.40	13.90
L. S. charcoal, Chicago..	15.75	15.75	15.75	15.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh..	19.00	19.00	19.00	20.00
O.-h. billets, Pittsburgh..	19.00	19.00	19.00	20.00
O.-h. sheet bars, P'gh...	20.00	20.00	20.00	21.00
Forging billets, base, P'gh.	24.00	24.00	24.00	24.00
O.-h. billets, Phila.....	21.40	21.40	21.40	22.40
Wire rods, Pittsburgh...	25.00	25.00	25.00	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	11.00	11.00	11.00	13.00
Iron rails, Philadelphia..	13.00	13.00	13.00	15.50
Carwheels, Chicago.....	**9.75**	9.50	9.50	11.50
Carwheels, Philadelphia.	**10.25**	10.00	9.50	12.00
Heavy steel scrap, P'gh.	**11.00**	10.75	10.00	10.75
Heavy steel scrap, Phila.	9.50	9.50	9.25	10.00
Heavy steel scrap, Ch'go	**8.50**	8.25	8.00	9.00
No. 1 cast, Pittsburgh..	**11.25**	10.50	10.50	12.00
No. 1 cast, Philadelphia.	11.50	11.50	11.00	12.00
No. 1 cast, Ch'go (net ton)	**9.25**	9.00	8.50	10.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel, Per Lb. to Large Buyers:	Dec. 23, 1914. Cents.	Dec. 16, 1914. Cents.	Nov. 25, 1914. Cents.	Dec. 24, 1913. Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.17½	1.17½	1.12	1.22½
Iron bars, Pittsburgh....	1.15	1.15	1.15	1.35
Iron bars, Chicago.....	0.95	0.95	0.95	1.10
Steel bars, Pittsburgh....	1.05	1.05	1.10	1.20
Steel bars, New York....	1.21	1.21	1.26	1.36
Tank plates, Pittsburgh.	1.05	1.05	1.05	1.20
Tank plates, New York..	1.21	1.21	1.26	1.36
Beams, etc., Pittsburgh..	1.05	1.05	1.10	1.20
Beams, etc., New York..	1.21	1.21	1.26	1.31
Skelp, grooved steel, P'gh	1.10	1.10	1.10	1.20
Skelp, sheared steel, P'gh	1.15	1.15	1.15	1.30
Steel hoops, Pittsburgh..	1.20	1.20	1.25	1.35
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.80	1.80	1.85	1.90
Galv. sheets, No. 28, P'gh	2.75	2.75	2.85	2.90
Wire nails, Pittsburgh...	1.50	1.50	1.55	1.55
Cut nails, Pittsburgh....	1.55	1.55	1.60	1.55
Fence wire, base, P'gh..	1.30	1.30	1.35	1.35
Barb wire, galv., P'gh...	1.90	1.90	1.95	1.95
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt...	$1.50	$1.50	$1.50	$1.75
Furnace coke, future....	1.75	1.75	1.75	1.85
Foundry coke, prompt...	1.90	1.90	1.90	2.50
Foundry coke, future....	2.15	2.15	2.15	2.60
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	*13.50*	13.62½	12.62½	14.62½
Electrolytic copper, N. Y.	*13.25*	13.37½	12.50	14.37½
Spelter, St. Louis.....	*5.50*	5.65	5.15	5.00
Spelter, New York.....	*5.65*	5.80	5.30	5.15
Lead, St. Louis.....	*3.65*	3.67½	3.77½	3.95
Lead, New York.....	3.80	3.80	3.90	4.10
Tin, New York.....	*33.30*	34.75	33.87½	36.65
Antimony, Hallett's, N. Y.	*13.50*	14.00	15.00	7.00
Tin plate, 100-lb. box, P'gh	$3.10	$3.10	$3.15	$3.40

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.05c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9....	.25
Gauges under No. 9 to and including No. 10...	.30
Gauges under No. 10 to and including No. 12...	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.05c. to 1.10c.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.30; galvanized, $1.70. Galvanized barb wire and fence staples to jobbers, $1.90; painted, $1.50. Wire nails to jobbers, $1.50. Woven wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	12	14	15	16
Annealed	$1.45	$1.50	$1.55	$1.60	$1.70	$1.80	$1.90	$2.00
Galvanized ...	1.85	1.90	1.95	2.00	2.10	2.20	2.60	2.70

Wire Rods.—Bessemer, open-hearth and chain rods, $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from November 2, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜...	74	53½	⅛ and ¼.....	66	47
½	78	67½	⅜	65	46
¾ to 3.....	81	72½	½	69	56
			¾ to 2½.....	72	61

Lap Weld

2	78	69½	1¼	56	45
2½ to 6.....	80	71½	1½	67	56
7 to 12.....	77	66½	2	68	58
13 and 14.....	63½	..	2½ to 4.....	70	61
15	61	..	4½ to 6.....	70	61
			7 to 12	68	55

Reamed and Drifted

1 to 3, butt.....	79	70½	1 to 1½, butt...	70	59
2, lap	76	67½	2, butt	70	59
2½ to 6, lap....	78	69½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap....	68	59

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜...	69	58½	⅜	63	52
½	74	67½	½	67	60
¾ to 1½.....	78	71½	¾ to 1½.....	71	62
2 to 3	79	72½	2 and 2½.....	72	63

Lap Weld, extra strong, plain ends

2	75	66½	1½	65	59
2½ to 4.....	77	68½	2	66	58
4½ to 6.....	76	67½	2½ to 4.....	70	61
7 to 8.....	69	58½	4½ to 6.....	69	60
9 to 12.....	64	53½	7 to 8.....	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	64	57½	½	57	49
¾ to 1½.....	67	60½	¾ to 1½.....	60	52
2 to 2½.....	69	62½	2 and 2½.....	62	54

Lap Weld, double extra strong, plain ends

2	65	58½	2	55	49
2½ to 4.....	67	60½	2½ to 4.....	60	54
4½ to 6.....	66	59½	4½ to 6.....	59	53
7 to 8	59	48½	7 to 8	52	42

To the large jobbing trade an additional 5 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.....	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.....	49
2½ and 2¾ in.....	65	2¼ in.	45
3 and 3¼ in.....	70	2½ to 2¾ in.....	54
3½ and 4½ in.....	72	3 and 3¼ in.....	57
5 and 6 in.....	65	3½ and 4½ in.....	60
7 to 13 in.....	62	5 and 6 in.....	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, as follows, f.o.b. Pittsburgh, terms 30 days

net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Anncaled Sheets

	Cents per lb.
Nos. 3 to 8	1.25 to 1.30
Nos. 9 to 10	1.30 to 1.35
Nos. 11 and 12	1.35 to 1.40
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.55 to 1.60

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.75 to 1.80
No. 12	1.85 to 1.90
Nos. 13 and 14	1.85 to 1.90
Nos. 15 and 16	2.00 to 2.05
Nos. 17 to 21	2.15 to 2.20
Nos. 22 and 24	2.30 to 2.35
Nos. 25 and 26	2.45 to 2.50
No. 27	2.60 to 2.65
No. 28	2.75 to 2.80
No. 29	2.90 to 2.95
No. 30	3.05 to 3.10

Pittsburgh

PITTSBURGH, PA., December 22, 1914.

Following the advance of 5 per cent. on freight rates allowed the Eastern railroads, reports are current of large contracts for rails, cars and other railroad supplies to be placed soon after January 1. The better sentiment of the past month or more is also developing into orders, and more contracts have been placed this month than for three or four months. Railroads are anxious to buy small track materials for all of 1915 delivery, but most mills are refusing to quote beyond first half. The tone of the market is firmer, and it is believed that by January 1 the 1.05c. price on plates, shapes and steel bars will have pretty well disappeared. A local mill has turned down orders offered at 1.05c. on plates, shapes and bars for first quarter, and states it is firmly maintaining 1.10c. Pig iron is quiet, but there is some movement in billets and sheet bars. The large coke contracts are pretty well closed up. The scrap market is showing more activity, and steel scrap is up again this week 25c. to 50c. per ton. The whole market looks better than at any time since last June.

Pig Iron.—After the recent activity in basic and foundry pig iron, the local market is quiet. No large inquiries are out. There is some buying of foundry iron by small consumers who have not yet covered for first quarter, and it is stated that $12.75 at Valley furnace for No. 2 foundry is now being firmly held, with some sellers asking $13. We quote Bessemer iron at $13.75 to $14; basic, $12.50; malleable Bessemer, $12.75; No. 2 foundry, $12.75 to $13; gray forge, $12.50, all at Valley furnace with a freight of 95c. a ton for delivery in the Cleveland or Pittsburgh district.

Billets and Sheet Bars.—The Carnegie Steel Company reports that it is holding Bessemer and open-hearth sheet bars for first quarter at $20, f.o.b. Pittsburgh, and has made sales at that price, and has also readjusted some contracts to this basis for the same delivery. There is a fair inquiry for billets. A sale is reported of 2-in. billets at slightly under $20, this size usually taking an advance of $1 over 4 x 4 in. We quote Bessemer and open-hearth billets at $18.50, and Bessemer and open-hearth sheet bars $19, f.o.b. maker's mill, Youngstown; Bessemer and open-hearth billets, $19, and Bessemer and open-hearth sheet bars, $20 f.o.b. maker's mill, Pittsburgh. Forging billets are quoted at $24 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take $1 per ton extra. Axle billets are quoted at $21 to $22.

Ferroalloys.—It is believed that shipments of English 80 per cent. ferromanganese to this country will soon be resumed by consumers agreeing to give the required guarantees. There is little new inquiry, consumers being covered through the first quarter and first half of 1915. At present they are getting material as fast as they need it. We still quote English 80 per cent. at $68, seaboard, subject to delay in delivery, but some dealers who have stocks at seaboard points are asking higher prices. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20, and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—It is reported that soon after January 1 the Pennsylvania Railroad will come in the market for 60,000 tons. The new demand for light rails is only fairly active. A good part of the business being placed is going to the rerolling rail mills, which undersell light rails rolled from billets from $1 to $2 per ton. We quote standard section rails, made of Bessemer stock, at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots, 8 and 10 lb. sections, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c. Extras over the above prices are as follows:

Bond drilling, one hole	$0.045 per 100 lb.
Bond drilling, two holes	0.090 per 100 lb.
Bond drilling, one hole in flange	0.090 per 100 lb.
Bond drilling, two holes in flange	0.180 per 100 lb.
All 30 ft. and special lengths, down to but not including 12 ft.	0.045 per 100 lb.
Special lengths, 12 ft. and under	0.090 per 100 lb.
Notching	0.025 per 100 lb.

The above prices are for carload lots, the usual differentials being allowed for large lots.

Structural Material.—Inquiry is more active than for some time. The McClintic-Marshall Company has taken 1500 tons for pier sheds at New Orleans, and is the low bidder on the Sylvan avenue bridge in this city, 850 tons, contract for which has not yet been closed. The United States Steel Products Company has taken about 5000 tons of shapes for shipment to Greece, which will be rolled by the Carnegie Steel Company. We quote beams and channels up to 15-in. at 1.10c. for delivery in first quarter, and it is stated that the 1.05c. price for prompt delivery has about disappeared.

Plates.—The Union Tank Line recently placed 500 tank cars with the Standard Steel Car Company in this city, and last week the order was increased to 1000 cars. The Westmoreland Coal Company has placed 200 steel coal cars with the Cambria Steel Company, equally divided between steel hoppers and gondolas. It is stated that the Great Lakes Engineering Works, Detroit, has taken contracts for five vessels for which 10 000 to 12 000 tons of plates will be needed. The Pittsburgh-Des Moines Steel Company, this city, has taken a contract for nine oil tanks for the Government, each with a capacity of 2 000,000 gal. and intended for naval stations. They will require about 2000 tons of plates. We quote ¼-in. and heavier tank plates at 1.05c. to 1.10c., the latter price for delivery in the first quarter.

Sheets.—Heavy inquiry is in the market for blue annealed and black and galvanized sheets, for delivery over the first quarter, and it is stated that a large amount of business has already been closed. It is evident that consumers are convinced that prices have about reached bottom. Mill operations are better, two or three leading makers running this week close to 75 per cent. We quote No. 28 Bessemer black sheets at 1.80c. to 1.85c.; No. 28 galvanized, 2.75c. to 2.80c.; Nos. 9 and 10 blue annealed, 1.30c. to 1.35c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Wire Rods.—There is some foreign inquiry and a few small lots, up to 1000 tons, have lately been sold that netted makers $25 or higher at mill. Some large consumers are figuring on their contracts for first half. We quote Bessemer, open-hearth and chain rods at $25, f.o.b. Pittsburgh.

Tin Plate.—It is estimated that fully 75 per cent. of all the tin plate to be made next year is under contract. One leading maker states it has sold 83 per cent. of all the tin plate it expects to make next year, and is now quoting to regular customers only. Mill operations are quieting down and will probably grow less until about February 1, when a start will be made on 1915 contracts. On the smaller contracts that remain to be closed, mills are quoting about $3.10 to $3.15 per base box, but on an exceptionally nice order the $3.10 price would be shaded. Prices on 20 x 28 terne plate for first half of 1915 delivery are as follows:

Base weight	Coating, lb.	Price
100-lb.	8	$6.30
I.C.	8	6.60
I.C.	12	7.85
I.C.	15	8.30
I.C.	20	9.25
I.C.	25	10.00
I.C.	30	11.00
I.C.	35	12.00
I.C.	40	13.00

For each cross 90c. is added to the price for I.C. Extra of $1 for pure palm oil process. Odd sizes are 10c. extra, unless 100 base boxes per item are ordered for shipment in 50-box lots not over 60 days apart.

Shafting.—New demand is light. Specifications from automobile makers are fair, but from the implement trade are quiet. We quote cold-rolled shafting at 67 per cent. off delivered in base territory, on current orders, but for a very desirable specification this price might be shaded.

Nuts, Bolts and Rivets.—A number of large consumers have covered their needs of nuts and bolts for first half of 1915, and it is stated exceptionally low prices were made. The new demand for rivets is dull and prices are lower. We quote structural rivets at 1.35c. to 1.45c. and boiler rivets at 1.45c. to 1.50c. in carload lots, small lots taking an advance of 5c. to 10c. Discounts on nuts and bolts have been much shaded recently on business placed for first half of 1915.

Skelp.—There is no foreign inquiry at present and the domestic demand is dull. We quote: Grooved steel skelp, 1.10c. to 1.15c.; sheared steel skelp, 1.15c. to 1.20c.; grooved iron skelp, 1.50c.; sheared iron skelp, 1.50c. to 1.60c., delivered to consumers' mills in the Pittsburgh district.

Hoops and Bands.—Contracts are being made for first quarter on the basis of about 1.10c. for steel bands, with extras as per the steel bar card, and 1.25c. for steel hoops. For prompt delivery these prices might be shaded $1 on desirable orders.

Wire Products.—Heavy inquiry for barb wire has come out, one statement being that it aggregates over 100,000 tons, but this is probably exaggerated. One large maker states that fully 25 per cent. of its present output of barb wire is going abroad. The domestic demand for barb and fence wire is quite active, but for wire nails is dull, as this is the off season. We quote: Wire nails, $1.50; plain annealed wire, $1.30; galvanized barb wire and fence staples, $1.90; painted barb wire, $1.55, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at $1.55, f.o.b. Pittsburgh, in carload lots. We quote woven wire fencing at 73 per cent. off in carload lots, 72 on 1000-rod lots and 71 on smaller lots, all f.o.b. Pittsburgh.

Iron and Steel Bars.—Contracts for steel bars are being placed for delivery in first quarter on the basis of 1.10c., and some business has also been closed for second quarter at 1.15c., f.o.b. maker's mill, Pittsburgh. Makers of steel bars are not inclined now to quote below 1.10c., unless specifications accompany the order and it is to be shipped promptly. The demand for iron bars is dull and prices continue weak. We quote steel bars at 1.05c. for prompt shipment, 1.10c. for first quarter and common iron bars, made from part scrap, at 1.15c., f.o.b. Pittsburgh.

Merchant Steel.—An improvement in demand is looked for soon after January 1. Quiet conditions now prevail. Prices are more or less shaded and on small lots for prompt shipment are about as follows: Iron finished tire, ½ x 1½ in., and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c.

Cold-Rolled Strip Steel.—The new demand is not heavy and is mostly for small lots, but some consumers are trying to cover their requirements for first half. It is stated that a buyer from Russia is on his way to this country to place an order for 1200 to 1500 tons. We quote cold-rolled strip steel as follows: Hard rolled steel, 1½-in. and wider, under 0.20 carbon, sheared or natural mill edges, per 100 lb., $2.65 to $2.75 delivered. Extras, which are standard among all the mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier	Base	$0.25	$0.10
0.099 to 0.050	$0.05	0.25	0.15
0.049 to 0.035	0.20	0.25	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only

Wrought Pipe.—The demand for wrought iron and steel pipe is quieting down, as it always does in the last half of December, to revive early in the new year. Discounts are firm.

Boiler Tubes.—Several large consumers are figuring on placing contracts for their requirements for first half. Discounts are shaded.

Old Material.—The improvement in demand continues and prices show a further advance. Local dealers are not inclined to sell except such material as they have to move. One local consumer has picked up in the last 30 days 10,000 tons or more of selected heavy steel scrap for which from $10.50 to $11.25 per gross ton, delivered, was paid. Two consumers in the Youngstown district have also been buying steel scrap quite freely. Prices on heavy melting steel, sheet scrap No. 1 foundry cast, bundled sheet scrap and several other grades are up from 25c. to 50c. per ton. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$11.00 to $11.25
Compressed side and end sheet scrap	9.75 to 10.00
No. 1 foundry cast	11.25 to 11.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.00 to 9.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.00 to 10.25
Railroad grate bars	8.50 to 8.75
Low phosphorus melting stock	13.25 to 13.50
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	9.75 to 10.00
No. 2 busheling scrap	6.00 to 6.25
Machine shop turnings	7.50
Old carwheels	10.75 to 11.00
Cast-iron borings	8.00
*Sheet bar crop ends	11.00 to 11.25
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	10.75 to 11.00

*Shipping point.

Coke.—Last week Corrigan, McKinney & Co., Cleveland, contracted with the W. J. Rainey coke interest for their entire requirements of coke for 1915, at the reported flat price of $1.75 per net ton at oven. All the important blast-furnace interests that buy coke in the open market are now covered for first half and some for all of 1915, and the coke situation has quieted down. There is not much demand for foundry coke, strictly standard 72-hr. being held at about $2 for prompt shipment and from $2.15 to $2.25 for first half. Prompt blast furnace coke is $1.50 to $1.60, and on contracts $1.75 per net ton at oven for the best grades. The Connellsville Courier reports the output of coke in the upper and lower Connellsville regions for the week ended December 12 as 196,275 tons, an increase of 700 tons over the previous week.

Chicago

CHICAGO, ILL., December 22, 1914.

A review of last week is colored by the more favorable complexion of affairs in the last day or two. Unquestionably the influence of the favorable rate decision, though of too recent happening to be reflected in actual business, has been a strengthening factor in the market. The inauguration of railroad buying is now awaited as a logical conclusion. The impetus of the better feeling is noted in a substantial inquiry for bar iron and for track fastenings, one road asking for quotations on 20,000 kegs of spikes. In actual orders the business of last week was restricted, the customary dullness of the holiday period having ruled the market. There is as yet no improvement in the directions where prices have been especially ragged and little can be expected until mill order books are in much better shape. Sales of pig iron to some of the more important buyers in this district were concluded during the week—not, it is generally reported, without some sacrifice in price. For the time being the buying movement appears to be tapering off. The scrap market continues to show every appearance of strength, but there is likelihood of a severe test of the resources of those who are supporting the advance in prices.

Pig Iron.—The closing up of several transactions involving substantial tonnages of Northern iron was brought about during the week, and it is generally understood that these more tardy but very desirable buyers have not been compelled to pay anything in the way of a premium because of their delay in purchasing. The bulk of the business taken was secured by Northern furnaces, although in many sections of this territory the $9.50 Birmingham quotation establishes an attractive basis for purchase. In general the market activity appears to be quieting down, although a leading interest is still in the market for 2500 tons of malleable. Buying during the recent movement has been on a conservative scale and has been participated in by malleable foundries to a very limited extent. Accordingly, producers still expect a resumption of activity immediately following the first of the year. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a switching charge averaging 50c a ton:

Lake Superior charcoal	$15.75 to $16.75
Northern coke foundry, No. 1	13.25 to 13.75
Northern coke foundry, No. 2	12.75 to 13.25
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	13.75 to 14.25
Southern coke, No. 2 f'dry and 2 soft	13.50 to 13.75
Malleable Bessemer	12.75 to 13.25
Standard Bessemer	15.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—The market has been practically devoid of rail transactions. There has been some buying of track fastenings and an even more encouraging inquiry, the Pennsylvania Lines inviting figures on 20,000 kegs of spikes. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.90c. to 2c. base, all in carload lots, Chicago; tie plates, $23.50 to $25, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 134c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb.; 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

Structural Material.—The booking of orders for structural steel has been of little consequence. Specifications have been only fair, and the market generally has reflected the customary December quietness. The Rochester Bridge Company will furnish 500 tons of steel for a school building at Chicago, and it is reported that the Joliet Bridge & Iron Company has re-entered competition for fabricated steel by taking 450 tons for the Laclede Gas & Coke Company at East St. Louis. Another contract is for 323 tons for a school building at Seattle, the steel to be furnished by the Hofius Steel & Equipment Company. Some contracting for first quarter material continues on the established basis of 1.10c., Pittsburgh, but for immediate shipment tonnage 1.20c. to 1.25c. Chicago, continues to obtain.

Orders for steel out of stock have fallen off quite noticeably. We continue to quote for plain material from store 1.75c., Chicago.

Plates.—Local mills have been able to gather up from miscellaneous sources enough work to run their mills almost continuously single turn. But plates for railroad equipment have been almost entirely lacking, and there is nothing tangible in sight, although it is reported that the Illinois Central is again seriously considering the purchase of several thousand cars. No improvement can be reported as to prices, and we continue to quote for Chicago delivery of plates from mill 1.189c. to 1.25c.

For plates out of store we quote 1.75c., Chicago.

Sheets.—The weaknesses in sheets which have been especially pronounced with respect to galvanized, carrying the market down to the basis of 2.70c., Pittsburgh, for prompt shipment, have become a general condition. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.489c.; No. 28 black, 1.989c.; No. 28 galvanized, 2.889c. to 2.939c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

Bars.—An encouraging inquiry for iron bars, including various lots from 1000 to 7000 tons for delivery during the first quarter and first half, presents one instance where the more favorable market sentiment appears to have had a tangible result. The mills, however, are not disposed to consider contracting until prices take a more favorable turn. Already the extremely low quotations for bar iron appear to have been withdrawn. Concerning steel bars, little can be said, although for reinforcing purposes proposals are beginning to be made up on work for the spring. We quote for mill shipments as follows: Bar iron, 0.95c. to 1c.; soft steel bars, 1.189c. to 1.25c.; hard steel bars, 1.15c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—In the bolt trade there is a moderate degree of activity but prices are exceedingly weak and our quotations are little better than nominal. The marketing of rivets is handicapped by a very sporadic demand, coupled with profitless prices. We continue to quote: Carriage bolts up to ⅜ x 6 in., rolled thread, 85; cut thread, 80-20; larger sizes, 80; machine bolts up to ¾ x 4 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; coach screws, 85-10; hot pressed nuts, square head, $6.60 off per cwt.; hexagon, $7.60 off per cwt. Structural rivets, ¾ to 1¼ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c., additional.

Store prices on bolts are subject to radical concessions and a new schedule of discounts seem inevitable. Nominally we quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅜ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Wire Products.—The closing up of wire business is proceeding at a satisfactory rate, a condition traceable in part to the final efforts of salesmen who will shortly be called in for the holiday period. The booking of businesss at 1.50c., Pittsburgh, is still commonly reported. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.539; wire nails, $1.739; painted barb wire, $1.739; galvanized, $2.139; polished staples, $1.739; galvanized, $2.139; polished staples, $1.739; galvanized, $2.139, all Chicago.

Cast-Iron Pipe.—The most important pipe business of the week was the contracting by the local gas company for 5000 to 7000 tons. A few small jobs for municipal waterworks are reported but the week scheduled no lettings of importance. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $25.50; 6 to 12 in., $23.50; 16 in. and up, $23, with $1 extra for gas pipe.

Old Material.—Although the scrap recently bought is being delivered in this market much faster than it can be absorbed at the present rate of buying by consumers, there is as yet no indication that the advances recently established will not continue to be maintained. Dealers in many instances will be under the necessity of carrying considerable quantities of scrap and thus far seem reconciled to this policy. Some grades of yard scrap in particular are so closely held that prices are disproportionately high as compared with other related grades. There has been enough of consumer buying at the higher prices to quite clearly establish the market, and this acceptance of conditions, together with the fact that the market was at an exceptionally low level, points to the probable permanence of the advance thus far brought about. The only railroad offering of importance is 2800 tons from Chicago, Milwaukee & St. Paul. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$11.00 to $11.25
Old steel rails, rerolling	9.50 to 10.00
Old steel rails, less than 3 ft.	9.50 to 9.75
Old carwheels	9.75 to 10.00
Heavy melting steel scrap	8.50 to 9.00
Frogs, switches and guards, cut apart	8.50 to 9.00
Shoveling steel	8.25 to 8.50
Steel axle turnings	6.50 to 7.00

Per Net Ton

Iron angles and splice bars	$11.00 to $11.50
Iron arch bars and transoms	11.00 to 11.50
Steel angle bars	7.50 to 7.75
Iron car axles	14.00 to 14.25
Steel car axles	10.50 to 11.00
No. 1 railroad wrought	8.00 to 8.50
No. 2 railroad wrought	7.50 to 7.75
Cut forge	7.50 to 7.75
Steel knuckles and couplers	8.25 to 8.50
Steel springs	9.00 to 9.50
Locomotive tires, smooth	8.50 to 9.00
Machine shop turnings	5.00 to 5.25
Cast borings	4.50 to 4.75
No. 1 busheling	7.00 to 7.50
No. 2 busheling	5.75 to 6.25
No. 1 boilers, cut to sheets and rings	5.00 to 5.50
Boiler punchings	7.75 to 8.00
No. 1 cast scrap	9.25 to 9.50
Stove plate and light cast scrap	8.00 to 8.25
Grate bars	7.50 to 8.00
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.25 to 7.50
Pipes and flues	6.00 to 6.50

The old firm of S. Morris & Co., dealers in scrap iron, steel and metals, 1101-1119 South Canal street, Chicago, Ill., has undergone a change in ownership. After more than 40 years of active business life, Selig Morris has decided to retire and has disposed of his interest in the firm to his partners, George F. Davie and Louis Morris, who will continue the business as heretofore.

Philadelphia

PHILADELPHIA, PA., December 22, 1914.

A uniformly better feeling and in some directions a larger volume of business, the latter mostly at the expense of prices, are the salient features of the market. Great reliance is placed on the expected stimulation of buying by the railroads as a result of the freight rate decision, though the consensus of opinion appears to be that the roads will not increase their activity in the desired direction until about the middle of January and that they will then proceed rather conservatively. Many believe that the good effect of the decision of the Interstate Commerce Commission is to some extent offset by the action of the Public Service Commission of Pennsylvania in ordering a reduction of 40c. per ton in the freight rate for anthracite coal carried to Philadelphia from the coal fields of the State. For sizes less than pea a reduction of 25c. is ordered. Plates and structural material are but little changed so far as demand goes. In bars a better business has been done. On prompt deliveries, prices based on 1.05c. Pittsburgh are uniform, though with all three there have been dips below this level. Sheets are a trifle more active at the lower level prevailing. Billets show weakness. In pig iron some good-sized lots have been taken, but the buying for the year is believed to be about at an end. Coke and old material are still uninteresting to consumers.

Pig Iron.—The aggregate of last week's sales represents a large quantity of iron. The orders were confined to a few sellers and others not so favored found their sales much smaller than in the previous week. Pipe founders are known to be looking for cheap iron and may buy before the end of the year, but otherwise it is believed that most purchasing will be deferred until after the first of January. Prices show no improvement. One seller booked an order for 4000 tons at $13.50, delivered to a Delaware River pipe shop. A soil pipe plant has an inquiry out for 1000 tons. A Reading company is in the market for 600 tons of foundry iron for the second quarter. Occasionally a good price is obtained for small lots, as where 100 tons of eastern Pennsylvania foundry was sold at $14.25 at furnace, for future delivery, to a point taking an 80c. freight rate, making the delivered price $15.05. Virginia iron has been exceedingly quiet, but some good-sized sales of Alabama iron have been made, Southern pipe makers and other consumers in the South taking about 12,000 tons of mixed grades, mostly low, including Nos. 3 and 4, gray forge and No. 2 soft. This activity is the best that has been shown by Southern melters in some time. Basic has been dull, but good sales have again been made in standard low phosphorus and at full quotations, despite the recent cutting of prices by a new producer. Between 3000 and 4000 tons have been taken, principally by an eastern Pennsylvania steel company, which was adding to previous commitments. Lebanon low phosphorus has been active, considering recent conditions, the sales of the week amounting to between 4000 and 5000 tons, at between $16.50 and $17 at furnace. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X foundry	$14.25 to $14.50
Eastern Penna. No. 2 plain	14.00 to 14.25
Virginia No. 2 X foundry	15.25
Virginia No. 2 plain	15.00
Gray forge	13.50 to 13.75
Basic	13.50 to 14.00
Standard low phosphorus	20.00 to 21.00

Ferroalloys.—Practically no change is reported in the ferromanganese situation and $68, Baltimore, continues to be asked, subject to guarantee as to its ultimate disposition. A case is mentioned where a consumer, on advice of his attorney, hesitated to sign the guarantee which England now exacts as a condition of sale. Morally, the agreement entered into is in restraint of trade, the lawyer said, and these are days when care must be taken in signing anything inasmuch as it might be produced against the purchaser later. The solution in this case seemed to be to file a statement of the circumstances with the Washington authorities. Quotations on 50 per cent. ferrosilicon are unchanged at $71 to $73, Pittsburgh, according to quantity.

Plates.—The week brought no change in the slow condition which has prevailed for some time with manufacturers of plates. Those who supply small, miscellaneous lots are getting 1.25c., Philadelphia, for this class of business, but concessions have been made to more important customers. Sales have been made at 1.20c. in this territory, though a case is known where both mill and consumer agree to split the difference and make the price for a round lot 1.22½c., Philadelphia. Hope is expressed that more business will emanate from the shipbuilders in 1915. A railroad was the purchaser of between 1000 and 1500 tons.

Structural Material.—The market continues flat, and complaint is heard that 1.18½c., Philadelphia, which is less than the 1.05c., Pittsburgh base, has been offered by a seller who has taken advantage of the difference in freight between Pittsburgh and the mill in question. The general quotation for delivery here is 1.20c. The Lehigh & Wilkes-Barre Coal Company has invited bids on a breaker which will require between 500 and 600 tons of material.

Bars.—Some good sales have been made in steel bars for first quarter delivery, the aggregate booked by one company being between 6000 and 7000 tons, which included a purchase of 1000 tons by a railroad. On contracts 1.25c., Philadelphia, is sought, but prompt business has been taken at 1.20c., and concessions from this price have been made even in the case of small lots,

though it must be admitted that the low price has been turned down in some directions. Iron bars are weak at 1.17½c., Philadelphia.

Sheets.—The demand is slightly better at 1.45c. to 1.50c. for No. 10 blue annealed sheets. First quarter contracts are more active at an advance of $1 to $2 per ton over the quotations mentioned. As heretofore said producers could ea ily load up with contracts at prevailing prices, but are disinclined to do so.

Billets.—Most producers find business unimproved. They continue to quote $21.40, Philadelphia, which is based on $19, Pittsburgh, but sale: have been made at concessions. An eastern Pennsylvania mill could have taken a large contract for export had it been willing to accept a substantial loss, which it declined to do, despite the suggestion of a foreign buyer that "breaking in" the foreign market would make the lo:s worth while. A horseshoe maker bought 1000 tons of 2-in. billets at a low price, which, it is understood, are to be manufactured into horseshoes for export.

Coke.—The market continues dull, with a few good inquiries out for furnace coke, one of which calls for 10,000 tons per month for six months. Quotation: are practically uncharged at $1.60 to $1.75 per net ton at oven, for first quarter furnace coke and $2 to $2.25 for prompt foundry and $2.35 to $2 50 for contract foundry. Freight rates from the prinicpal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—An improvement in sentiment is the only change in the market, except a tendency on the part of sellers to cover orders for material and be prepared for the better business which they feel will develop in January. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$9.50 to $10.00
Old steel rails, rerolling	11.50 to 12.00
Low phosphorus heavy melting steel scrap	13.50 to 14.00
Old steel axles	13.00 to 13.50
Old iron axles	17.50 to 18.00
Old iron rails	13.00 to 14.00
Old carwheels	10.25 to 10.75
No. 1 railroad wrought	11.50 to 12.00
Wrought-iron pipe	9.50 to 10.00
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 busheling	7.75 to 8.25
Machine shop turnings	7.75 to 8.25
Cast borings	7.75 to 8.25
No. 1 cast	11.50 to 12.00
Grate bars, railroad	8.00 to 8.50
Stove plate	8.00 to 8.50
Railroad malleable	9.00 to 9.50

Cleveland

CLEVELAND, OHIO, December 22, 1914.

Pig Iron.—A moderate volume of business in small lots is coming out in contracts for foundry iron for the first half, the market appearing more active in the surrounding territories than in northern Ohio. One Cleveland interest reports sales during the week aggregating about 9000 tons of Lake furnace iron in lots of 1000 tons and under. So far there has not been a general price advance that might bring into the market consumers who have not yet bought but prices are firm at present levels and show a stiffening tendency. While Valley prices are a little firmer, with quotations ranging from $12.75 to $13.25 for No. 2 prices asked by Cleveland and some other Lake furnaces are unchanged. Southern iron is dull, a few small-lot sales being reported at $10, Birmingham, for No. 2 for the first half. This quotation is made by Tennessee furnaces, but some Alabama iron is still being offered at $9.50. A few foundries are melting more iron than a month ago but the improvement is not general. We quote delivered Cleveland as follows:

Bessemer	$14.70 to $14.95
Basic	13.45
Northern No. 2 foundry	13.25
Southern No. 2 foundry	$13.50 to 14.00
Gray forge	13.00
Jackson Co. silvery 8 per cent. silicon	17.62
Standard low phos., Valley furnace	20.00 to 20.25

Iron Ore.—That the carrying charges during 1915 will be on the 1914 basis is indicated by the fact that some coal contracts have been placed on the basis of 30c. to the head of the Lakes and to Lake Michigan ports, with the exception of Chicago, where 40c. will be paid. Practically the entire coal movement during 1914 was at these rates. Little ore is moving from the docks. We quote prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3.00; Mesaba non-Bessemer, $2.85.

Coke.—Corrigan, McKinney & Co. have closed contracts for their coke requirements for the entire year 1915. Quotations on this business for the first half were $1.70 to $1.75 per net ton at oven, few producers being willing to quote for the last half. This firm, with two furnaces out of blast, is at present using about 40,000 tons of coke per month. A sale of 28,000 tons of Virginia foundry coke for the first half is reported in Chicago at $2.25 at oven. Small-lot sales in Ohio territory are being made at $2 40. We quote best makes of Connellsville foundry coke at $2.25 to $2.50 for contracts.

Finished Iron and Steel.—There is some improvement in current orders and specifications and the sentiment in the steel trade has improved. The rate decision has caused an optimistic feeling and is expected indirectly to help the situation, although no important tangible results in the way of railroad orders are looked for at once. The implement trade in this territory is being covered with steel bar contracts through the entire first half on the 1.10c. Pittsburgh, basis. With the exception of this trade, 1.15c., Pittsburgh, is the usual quotation beyond the first quarter. Prices are firm at the present level. The bulk of consumers have contracted for their first quarter steel bar, plate and structural requirements at 1.10c., Pittsburgh. The 1.05c. price is the general quotation for prompt specifications. Competition from mills making hard steel bars is unusually keen and quotations down to 1.02½c., Pittsburgh, are reported. Iron bars are in light demand with the price unchanged, at 1c., Cleveland, for outside shipment. A leading Ohio automobile interest has closed contracts for several thousand tons of special forging steel bars, covering its first half requirements. In structural lines no new contracts or inquiries are reported. A contract for 800 tons of plain reinforcing bars has been placed for a building for the Willys-Overland Company, Toledo. Fabricated work is being taken at very low prices. One structural steel building recently placed by the Willys-Overland Company was taken at $32.50 a ton, fabricated. The demand for sheets is not active and prices are weak. The general minimum quotations for prompt shipment and for first quarter contracts are 1.80c. Ohio mill, for No. 28 black, 2.80c. for No. 28 galvanized and 1.35c. for No. 10 blue annealed. A number of the Ohio sheet mills have shut down and will not resume operations until January 4. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Nuts, Bolts and Rivets.—The demand for bolts and nuts has improved. Inquiries are pending for some round lot current orders, mostly from jobbers who wish to replenish their stocks after taking inventories. Some new inquiries for contracts are coming out. Regular prices are being well maintained for contracts, but spot business is being taken at 5 to 10 per cent. below regular quotations. Some rivet contracts are being placed for the first quarter but prices are not firm and regular quotations at 1.45c., Pittsburgh, for structural and 1.55c. for boiler rivets are being shaded $1 a ton on contracts. Discounts are as follows: Common carriage bolts ⅝ x 6 in., smaller or shorter rolled thread, 80 and 10 and 5 per cent.; cut thread, 80 and 10 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, ⅝ x 4 in., smaller or shorter, rolled thread, 80 and 10 and 10 per cent.; cut thread, 80 and 10 and 5 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 5 per cent.; square h. p. nuts, blank or tapped, $6.50 off; hexagon h. p. nuts, blank or tapped, $7.40 off; c. p. c. and t. square nuts, blank or tapped, $6.20 off; hexagon ⅝ in. and larger, $7.50 off; 9/16 in. and smaller, $8 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 10 per cent., 9/16 in. and smaller, 85, 10, 10 and 10 per cent.

Old Material.—Youngstown mills that bought quite freely recently are well supplied for their requirements until February and there is practically no new demand from consumers. Little activity is expected in the next few weeks but the sentiment among dealers has improved and prices are firm at recent levels. Prices on steel car axles have advanced 50c. a ton and cast scrap is bringing slightly better prices. Sales of turnings to dealers are reported at prices ranging from $5.25 to $5.60. We quote f. o. b. Cleveland as follows:

	Per Gross Ton	
Old steel rails, rerolling	$11.00 to	$11.75
Old iron rails		12.00
Steel car axles	12.25 to	12.75
Heavy melting steel	9.25 to	9.50
Old carwheels	10.00 to	10.50
Relaying rails, 50 lb. and over	23.00 to	25.00
Agricultural malleable	8.00 to	8.50
Railroad malleable	9.25 to	9.50
Light bundled sheet scrap	7.50 to	8.00
	Per Net Ton	
Iron car axles	$16.75 to	$17.00
Cast borings	5.50 to	5.75
Iron and steel turnings and drillings	5.00 to	5.25
Steel axle turnings	6.00 to	6.25
No. 1 busheling, new	8.00 to	8.50
No. 1 busheling, old	8.00 to	8.25
No. 1 railroad wrought	9.00 to	9.50
No. 1 cast	10.00 to	10.50
Stove plate		7.50

Cincinnati

CINCINNATI, OHIO, December 22, 1914.

Pig Iron.—The market has been quiet the past week. Few inquiries are under negotiation and light sales are reported. A central Ohio consumer is asking for 400 tons of foundry iron for first half shipment, and a Western melter is inquiring in this territory for 1000 tons. Southern iron is more freely quoted at $9.50, Birmingham, but a number of brands are held at a higher figure. As far as this market is concerned, it is not possible to verify reports that Southern No. 2 foundry has been sold below $9.50 for prompt shipment, although it is known that contracts can be made for a first half supply at this figure. Melters who have not fully covered for first half requirements are inclined to postpone negotiations until after the holidays. Both basic and malleable are quiet, but there has been some activity in Ohio silvery irons in the past 30 days. Iron merchants consider it too early to forecast how soon the railroad freight rate increase will exert a favorable influence on the iron market. However, there is a much more optimistic feeling in manufacturing circles which will probably result in an improvement at an early date in the consumption of pig iron. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$12.90 to	$13.40
Southern coke, No. 2 f'dry and 2 soft	12.40 to	12.90
Southern coke, No. 3 foundry	11.90 to	12.40
Southern No. 4 foundry	11.40 to	11.90
Southern gray forge	10.90 to	11.40
Ohio silvery, 8 per cent. silicon	17.20 to	17.70
Southern Ohio coke, No. 1	15.01 to	15.51
Southern Ohio coke, No. 2	14.01 to	14.51
Southern Ohio coke, No. 3	13.76 to	14.01
Southern Ohio malleable Bessemer		14.26
Basic, Northern	14.51 to	15.01
Lake Superior charcoal	15.25 to	17.25
Standard Southern carwheel	26.90 to	27.40

Old Material.—Business is quiet and prices are unchanged.

Buffalo

BUFFALO, N. Y., December 22, 1914.

Pig Iron.—The market has lost momentum temporarily and settled down to holiday season quiet. It is the opinion of furnacemen that the improvement in sentiment is not likely to show tangible results in increased consumption and new demand until considerably after the first of the year. Prices are well maintained notwithstanding the limited current demand. We quote as follows for first quarter delivery f.o.b furnace:

No. 1 foundry	$13.25 to	$13.50
No. 2 X foundry	13.00 to	13.25
No. 2 plain		13.00
No. 3 foundry		13.00
Gray forge	12.75 to	13.00
Malleable	13.00 to	13.25
Basic		13.50
Charcoal, regular grades and analysis	16.25 to	17.25
Charcoal, special grades and analysis		20.50

Finished Iron and Steel.—The freight-rate increase is having a beneficial effect. The mills are unwilling to go into the coming year at any lower prices than 1.10c. base Pittsburgh, on bars, plates and shapes. It is reported that a number of contracts have been closed at 1.10c. for first quarter and 1.15c. for second quarter. It is stated that a few special orders were taken a week ago at 1.05c. for immediate delivery, but all selling agencies claim that this concession has been withdrawn. Buying of tin plate is practically over, users having now covered for the season's requirements. There is some inquiry for cold rolled steel for first quarter use and business is being closed at 67 per per cent. discount, although one or two agencies are holding to 66 per cent. The Hamilton Bridge Works was this week awarded contract for the 6000 tons of steel required for the Bloor street viaduct, Toronto. The 300 tons for Troop I Armory, Buffalo, has been awarded to the McClintic-Marshall Company. The Lackawanna Bridge Company, Buffalo, has taken 400 tons for the Louisville & Nashville railroad shops at New Orleans.

Old Material.—Holiday quiet prevails. Prices are firmly held, with the expectation of good business developing with early mill activity arising out of the railroad rate increase. The schedule of dealers asking prices remains unchanged from last week, and is as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$9.50 to	$10.00
Low phosphorus steel	12.50 to	13.00
No. 1 railroad wrought scrap	9.50 to	10.00
No. 1 railroad and machinery cast	10.00 to	10.50
Old steel axles	11.50 to	12.00
Old iron axles	16.00 to	16.50
Old carwheels	10.00 to	10.50
Railroad malleable	9.00 to	9.50
Machine shop turnings	5.00 to	5.50
Heavy axle turnings	8.00 to	8.50
Clean cast borings	5.50 to	6.25
Old iron rails	10.50 to	11.00
Locomotive grate bars	8.50 to	9.00
Stove plate (net ton)	8.00 to	8.50
Wrought pipe	6.50 to	7.00
Bundled sheet scrap	5.75 to	6.25
No. 1 busheling scrap	7.00 to	7.50
No. 2 busheling scrap	5.00 to	5.25
Bundled tin scrap		10.00

Birmingham

BIRMINGHAM, ALA., December 21, 1914.

Pig Iron.—The large sales of pig iron by Southern makers in the last week of November and thus far in December do not appear to have strengthened prices. It is admitted by furnacemen that iron can still be had at $9.50 to $9.75, the latter price paid by Southern consumers for small lots. It is also generally admitted that the major portion of the business was done on the basis of $9.50 through the first half. The estimate of Southern iron booked in the past four weeks runs from 300,000 to 400,000 tons. A large part of this selling is popularly credited to one concern. There is a belief that not much iron was bought to cover foundrymen's orders in hand, but that most of it was taken on account of the inducements offered. Sales and stocks on hand in Alabama yards bear a close connection, the latter approximating something like 300,000 tons, of which largely over 200,000 tons is foundry. The new business, therefore, does not represent future manufacture to any great extent; hence there does not appear to be any disposition to blow in additional furnaces except possibly by one interest which sold the most iron. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$10.00 to	$10.25
No. 2 foundry and soft	9.50 to	9.75
No. 3 foundry	9.00 to	9.25
No. 4 foundry	8.75 to	9.00
Gray forge	8.50 to	8.75
Basic	9.50 to	10.00
Charcoal	22.50 to	23.00

Cast-Iron Pipe.—There has been active inquiry for pipe based on specifications to be placed later on, but the volume of new business has not been great. Sanitary pipe is dull and the output is restricted to about 50 per cent. Water and gas pipe are being manufactured on a basis of 70 per cent. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $20; 6-in. and upward, $18, with $1 added for gas pipe, and prices shaded on attractive business.

Coal and Coke.—The steam coal output rests at a 50 per cent. basis, practically all consumers using less than usual and a large amount of railroad coal being thrown on the general market. Coke is dull, but there is noted an increasing demand for the retort output as foundrymen become accustomed to it. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, $2.75 to $2.90; foundry, $3.20 to $3.40.

Old Material.—The market continues dull. Concessions are easily obtainable. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$13.00 to $13.50
Old steel axles	12.50 to 13.00
Old iron rails	12.00 to 12.50
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.00 to 7.50
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	8.50 to 9.00
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., December 21, 1914.

Pig Iron.—The pig-iron buying at this point in the past two weeks (this report having been delayed in the mails last week) has been heavy, with the total running well up to 30,000 or 35,000 tons, the heavier selling having been in the first week. The largest transaction was one of 10,000 tons of Northern basic, contracted for by a local industry, while the remainder of the aggregate included one sale of 2000 tons of Nos. 2 and 3 Southern for stove-making purposes, one of 2000 tons of malleable, three of Lake Superior charcoal aggregating 1350 tons, one of 1000 tons of No. 2 Northern foundry, one of 2000 tons of No. 2 Southern foundry, one of 300 tons and one of 400 tons of No. 2 Southern. A large number of small orders helped to run up the total. There are still outstanding an inquiry for 1100 tons of Nos. 2 and 3 Northern and one for 1200 tons of No. 2 Southern, together with several for smaller lots. Inquiries are decreasing for the moment, due to the holiday and inventory period, but are expected to revive after the coming year opens. Southern No. 2 is still obtainable at $9.50, Birmingham, on submitted offers, but not on open quotation. Some representatives are held to $9.75 and even $10.

Coke.—An inquiry for 500 tons of foundry coke for first half delivery is in the market and one for 12,000 tons of furnace grade, previously reported, is yet to be placed. By-product coke is quiet and quoted competitively with Connellsville.

Finished Iron and Steel.—Contractors are beginning to report figuring on contracts of some considerable size, but none has come out yet. They also report the financing of building propositions as much easier and that they anticipate considerable to be started from architects' offices soon. Demand for bars and structural material is improving steadily, and the turn of the year is anticipated as the beginning of some decisive movements. Standard steel rails are dead, while the coal companies are buying only such light rails as are absolutely necessary. The lumber interests are practically out of the market. Plates are in fair demand, considering conditions. Track fastenings are stagnant. The movement out of warehouse continues very good and evidences increasing need for material which, it is expected, will soon be translated into the contract market. We quote for stock out of warehouse: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, 2.55c.; No. 28 galvanized sheets, 3.55c.

Old Material.—The scrap market shows continued better tone, with the prices firmer and some business moving in steel and in foundry and rolling-mill grades. Dealers generally are looking for better business after the first of the year, particularly since the granting of increased railroad rates. Railroad lists recently closed brought high prices in practically all cases. Lists out since last report include 4000 tons from the Big Four, 300 tons from the Clover Leaf, 300 tons from the Cotton Belt and 700 tons from a local industry. Relayers are in a little better demand, but are scarce. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton	
Old iron rails	$10.00 to $10.25
Old steel rails, rerolling	9.50 to 10.00
Old steel rails, less than 3 ft.	9.00 to 9.50
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	10.00 to 10.25
No. 1 railroad heavy melting steel scrap	9.25 to 9.50
Shoveling steel	8.25 to 8.50
Frogs, switches and guards, cut apart	9.25 to 9.50
Bundled sheet scrap	5.00 to 5.50
Per Net Ton	
Iron angle bars	$10.00 to $10.50
Steel angle bars	8.50 to 8.75
Iron car axles	15.00 to 15.25
Steel car axles	10.50 to 10.75
Wrought arch bars and transoms	10.50 to 10.75
No. 1 railroad wrought	7.75 to 8.25
No. 2 railroad wrought	7.50 to 7.75
Railroad springs	8.25 to 8.50
Steel couplers and knuckles	8.25 to 8.50
Locomotive tires, 42 in. and over, smooth	8.25 to 8.75
No. 1 dealers' forge	7.00 to 7.25
Mixed borings	4.25 to 4.50
No. 1 busheling	7.25 to 7.50
No. 1 boilers, cut to sheets and rings	5.25 to 5.50
No. 1 railroad cast scrap	8.50 to 9.00
Stove plate and light cast scrap	7.00 to 7.25
Railroad malleable	6.50 to 6.75
Agricultural malleable	6.00 to 6.25
Pipes and flues	5.50 to 6.00
Railroad sheet and tank scrap	5.50 to 5.75
Railroad grate bars	6.50 to 7.00
Machine shop turnings	5.25 to 5.50

New York

NEW YORK, December 23, 1914.

Pig Iron.—There is some increase in foundry operations in New England and in New Jersey. Foundry proprietors speak more hopefully concerning business in the next two months, though they do not look for any great increase before spring. Pig-iron buying has come down to rather small proportions. A few sales have been made ranging from 100 to 300 tons, but there are no large inquiries and it is now likely the market will drift on into the new year without incident. Southern iron has sold at lower prices, but no important tonnage comes into this district. Virginia furnaces continue to quote $12.50 at furnace for No. 2 X and some sales have been made. One furnace in that district will start up in the near future, though without having made any considerable advance sale. Buffalo furnaces have made few new sales. Since $13 has been quoted as the general minimum there for No. 2 X, buyers have been abstaining from the market in view of the inability of producers in other districts to establish higher prices and of the fresh weakness of Southern iron. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.45 to $14.95; No. 2 X, $14.20 to $14.45; No. 2 plain, $13.95 to $14.20. Southern iron is quoted at $14.50 for No. 1 and $14 to $14.25 for No. 2.

Ferroalloys.—The market is exceedingly quiet. Though it is generally recognized that shipments of ferromanganeses are now possible under the conditions outlined last week notice of any definite sailings have not been received here. It is a fact that 1600 tons reached Baltimore last week for an importer who probably had some special arrangements with the other side. Not much activity is expected until after the holidays, though there are some inquiries now for delivery next year on which $68, seaboard, is being quoted. Material for quick delivery, if obtainable, can hardly be secured for less than $75, seaboard. Ferrosilicon, 50 per cent., is still quoted at $71 to $73, Pittsburgh, for immediate or future delivery.

Finished Iron and Steel.—The dullness is fully as great as expected. Inquiries from railroads have not yet materialized, but these are not yet expected. Some of the rumors concerning railroad car purchases appear without foundation. The largest transaction comprises 500 cars for the Union Tank Line placed with the Standard Steel Car Company with an option for 500 more after January 1. The Cambria Steel Company is to build 100 gondolas and 100 hopper cars for the Westmoreland Coal Company; the Haskell &

Barker Car Company 250 refrigerator cars for Morris & Co.; and the J. G. Brill Company 100 cars for the Boston Elevated System. The Long Island has entered the market for 20 passenger cars. Most business in finished lines lies in steel plates. It is expected shortly that the Standard Oil Company will close on its contracts for next year; it is understood that these may total 20,000 tons for the whole year or 10,000 tons for the first half. Lukens Iron & Steel Company will roll the plates for the Standard Oil tank steamers and plates for other shipbuilding, aggregating in all about 8,000 tons. Joseph T. Ryerson & Son have 1200 tons for a steel pipe line near Baltimore. The Pittsburgh-Des Moines Steel Company has been awarded the 2000 tons for the fuel oil tanks for the navy yards. Practically nothing new has developed in structural lines. The Pittsburgh Bridge & Iron Works has 500 tons for the Reserve bank at Warren, Ohio, and the Communipaw Steel Company, 125 tons for Cathedral college, Brooklyn. The Pennsylvania Railroad has closed for some nine or ten bridges averaging 100 tons each. We quote prompt mill shipments of steel bars, shapes and plates at 1.05c. to 1.10c. Pittsburgh, or 1.21c. to 1.26c., New York, but 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York, for first quarter, and iron bars at 1.20c. to 1.25c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plate and structural material at 1.85c. to 1.90c.

Cast-Iron Pipe.—The only municipal letting of importance in sight is that of Reading, Pa., on which bids will be opened December 28 for 1450 tons, mainly 36-in., the remainder 6 to 16 in. A great deal of private buying is now in progress, and a better tone has been imparted to the market. The Warren Foundry & Machine Company, the lowest bidder on the Baltimore letting for 7400 tons, has been advised today that it has received the award. Carload lots of 6-in. are quoted at $20 to $20.50 per net ton, tidewater.

Old Material.—While transactions are light, the market is firmer. Dealers are finding it more difficult to secure supplies of old material. Quotations are continued as follows, per gross ton, New York:

Old girder and T rails for melting	$7.25 to	$7.50
Heavy melting steel scrap	7.25 to	7.50
Relaying rails	19.00 to	19.50
Rerolling rails (nominal)	8.00 to	8.25
Iron car axles	14.00 to	14.25
Steel car axles	10.25 to	10.75
No. 1 railroad wrought	8.75 to	9.25
Wrought-iron track scrap	8.25 to	8.75
No. 1 yard wrought, long	8.25 to	8.75
No. 1 yard wrought, short	7.25 to	7.50
Light iron	3.50 to	4.00
Cast borings	5.50 to	6.00
Wrought turnings	5.50 to	6.00
Wrought pipe	7.00 to	7.25
Carwheels	8.75 to	9.25
No. 1 heavy cast, broken up	9.75 to	10.25
Stove plate	7.50 to	8.00
Locomotive grate bars	6.25 to	6.75
Malleable cast	7.00 to	7.50

Boston

BOSTON, MASS., December 22, 1914.

Old Material.—The dealers report some increase in the demand for steel scrap from the Pittsburgh district and a market sentimentally stronger. The railroad rate decision is received with a feeling of strong satisfaction. Prices in this territory have not been marked up, though they are stiffer for steel, and the general belief is that they will be higher in the near future. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel	$7.00 to	$7.75
Low phosphorus steel	13.75 to	14.75
Old steel axles	12.75 to	13.25
Old iron axles	20.25 to	20.75
Mixed shafting	12.00 to	12.25
No. 1 wrought and soft steel	8.25 to	8.75
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	7.00 to	7.50
Cotton ties (bundled)	5.25 to	5.75
No. 2 light	3.25 to	3.75
Wrought turnings	5.00 to	5.50
Cast borings	5.00 to	5.25
Machinery cast	10.75 to	11.00
Malleable	7.50 to	7.75
Stove plate	7.00 to	7.50
Grate bars	5.25 to	5.50

British Trade Improving

Home Consumption Growing—Pig Iron in Good Demand—Home Steel Makers Control Market

(*By Cable*)

LONDON, ENGLAND, December 23, 1914.

The tone of the market is still good, with a fair inquiry for pig iron for delivery in the first half of 1915, but makers are not willing sellers so far ahead. The home consumption is improving and the sentiment is pretty confident. The output continues much hampered by the scarcity of labor. Hematite pig iron is particularly strong, with some makers asking 75s. ($18.25), while sales have been made at over 70s. ($17.03). The excessive cost of ore, owing to high freights, dominates the position. Semi-finished steel is firm, and the British works now have the market to themselves, owing to the difficulty of booking freight from America. Few inquiries are in hand for rails. It is rumored that big contracts for bridge material for replacing bridges destroyed in France are being placed in America. Business in tin plates is poor, owing to export prohibition. Furnaces in blast in the three principal districts are 163, against 172 in the corresponding time last year. Stocks of pig iron in Connal's stores are 103,615 gross tons, against 102,828 tons last week. We quote as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f. o. b. Wales, 12s. 7½d. ($3.07).

Cleveland pig-iron warrants (Tuesday), 54s. 1d. ($13.16), against 53s. 7½d. ($13.05), last week.

No. 3 Cleveland pig iron, makers' price, f. o. b. Middlesbrough, 54s. 6d. ($13.26), against 54s. ($13.14) last week.

Steel black sheets, No. 28, export, f. o. b. Liverpool, £8 15s. ($42.58).

Steel ship plates, Scotch, delivered local yards, £6 17s. 6d. ($33.45).

Steel rails, export, f. o. b. works port, £6 5s. ($30.41).

Hematite pig iron, f. o. b. Tees, 70s. ($17.03).

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 17s. 6d. ($23.72).

Steel joists, 15 in., export, f. o. b. Hull or Grimsby, £6 15s. ($32.84).

Steel bars, export, f. o. b. Clyde, £7 5s. ($13.28).

Ore Stringency—Low Pig Iron Stocks—High Ocean Freights for American Steel

(*By Mail*)

LONDON, December 11, 1914.—The Cleveland pig-iron market remains firm with insignificant fluctuations in prices. The furnace owners adopt a very stiff attitude, being much impressed by the exceeding stringency of the ore position, which in its turn continues to be largely dominated by the freight market. There is some vague talk of making representations to the Government about the advance in freights, which is due to the chartering by the State of so many vessels, but the originators of the protest may as well save their breath to cool their porridge, for war knows no private inconveniences.

The price of hematite is especially strong for this freight reason. The Spanish mine owners are holding for high prices and the ship owners are insisting upon very tall figures for accommodation, but will accept less for the voyage from Spain to Glasgow than to Middlesbrough, for fear of mines. Furnacemen say that they cannot make iron at a profit with ore so dear, and they accordingly hesitate to make ore contracts at present, saying that the iron market must first rise to a corresponding extent. Consequently business in ore is slow.

The stocks of pig iron in the warrant stores are a negligible total, but it is generally assumed that the makers have fair quantities in their yards, which constitute an invisible reserve. Consumers are certainly short of material, for there has been very little in the general position of late to encourage purchasing in advance of needs, to say nothing of the doubtful wisdom of investing money in stocks of raw stuff at this period.

Mechanical and Civil Engineers,
PITTSBURGH, PA.

The entire position of the market is regarded therefore with some confidence, and there has been more disposition recently to buy iron on speculation. The closing of the Firth of Forth to all navigation has put considerable difficulty in the way of the Scotch consuming trade, and inserted a spoke in the wheel of the Middlesbrough iron maker who looks to sell heavily to Scotland.

AMERICAN STEEL SALES HAMPERED BY FREIGHT TERMS

There is not much doing in semi-finished steel, but business could be booked easily enough by American steel houses if it were possible to obtain freight room on reasonable terms. This same reason hampers the sale of finished material to Europe. Americans are trying to sell all sorts of steel here, but the difficulty alluded to makes their efforts of but little avail in the great majority of instances.

There is, of course, no Continental material available and with the markets practically left to themselves British makers are able to advance prices. The sentiment has undergone an enormous improvement within the past two months, and prices may go higher yet. The demands for all kinds of ship building material are very large, and enormous Government contracts are under execution for vessels and armament supplies generally.

There have been some heavy inquiries for wire in the market, one from the French Government calling for 15,000 tons.

Witting Brothers, Cannon street, London, have been appointed to represent the Pittsburgh Steel Company, Pittsburgh, in Great Britain.

Metal Market

NEW YORK, December 23, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
Dec.	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
16	13.50	13.37½	34.50	3.80	3.65	5.75	5.60
17	13.50	13.37½	34.05	3.80	3.65	5.70	5.55
18	13.50	13.37½	34.00	3.80	3.65	5.65	5.50
19	13.50	13.37½	.....	3.80	3.65	5.65	5.50
21	13.50	13.25	33.50	3.80	3.65	5.65	5.50
22	13.50	13.25	33.30	3.80	3.65	5.65	5.50

The demand for copper is light and prices are lower. Lack of buying has caused tin to decline. Heavy exports are the feature in lead. Spelter is quiet and lower. Antimony is dull and easier.

New York

Copper.—The market has been quiet. The producers have adhered to their recent advance, but resale lots have been offered at concessions which did not, however, incite any buying either on domestic or foreign account. Trade is of the opinion that domestic buyers will come into the market some time in January, but until then they do not look for any marked activity. Electrolytic copper is quoted at 13.25c., cash New York. Lake has held its own fairly well and there have been a few sales at 13.50c., cash. More business could have been done had sellers been willing to give concessions. Special brands have sold at a premium, but ordinary prime Lake is quoted to-day at 13.50c.

Tin.—Except on December 18 the market has been quiet. On that day there were fair sales for future delivery which followed the announcement of the freight rate decision. The advance which was granted to the railroads led traders to believe that business generally would be stimulated and they bought for the future. Up to the present time, since inquiry was received here from Russia, that country has taken about 200 tons of tin out of this market. The situation with regard to spot supplies has not changed much, the arrivals this month amounting to only 625 tons. There is afloat 2585 tons, the greater portion of which will arrive December 30 or December 31 and which, of course, will not be available for delivery this month. The stock of unsold Banca tin in Holland, November 30, was 3944 tons, as compared with 160 tons on the same date in 1913. The New York quotation yesterday was 33.30c., the decline being due entirely to the light demand. Heavy buying is not expected at this season.

Lead.—Quotations are firm at 3.80c., New York, and 3.65c., St. Louis, and there is nothing special to report, except the heavy exports of last month which are now coming to light. The steamer Indrakuala cleared for Vladivostok, November 14, with the largest consignment of pig lead ever taken out of this country, amounting to 5417 gross tons. Incidentally it may be remarked that the ship's cargo, aside from the lead, was principally absorbent cotton. The steamer Kursk, which cleared for Archangel November 20, took 1300 tons. The domestic demand is light.

Spelter.—Demand from all directions has tapered off and the market is lower at 5.65c., New York, and 5.50c., St. Louis. The producers are believed to be in a strong position and even light request for the metal would be sufficient to send prices upward.

Antimony.—Extreme dullness prevails and prices are weaker at 14.50c. to 15c. for Cookson's, 13.50c. to 14c. for Hallett's and 12.50c. to 13c. for Chinese. A representative of a Chinese producing company is in this country and it is probable that he will establish a direct selling agency.

Old Metals.—The market hesitates. Dealers' selling prices are nominally unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	12.25 to 12.50
Copper, heavy and wire	11.75 to 12.00
Copper, light and bottoms	10.75 to 11.00
Brass, heavy	9.00 to 9.25
Brass, light	7.00 to 7.25
Heavy machine composition	11.00 to 11.25
Clean brass turnings	8.25 to 8.50
Composition turnings	9.50 to 9.75
Lead, heavy	3.55
Lead, tea	3.30
Zinc, scrap	4.00

Chicago

DECEMBER 21.—The non-ferrous metal market has been quiet, though generally firm, with the exception of some concessions in lead prices by the smaller interests. Spelter quotations have also receded somewhat from the high point of a week ago. We have revised quotations as follows: Casting copper, 13c. to 13.25c.; Lake copper, 13.50c., for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 34.50c.; small lots, 37.50c.; lead, desilverized, 3.72½c. to 3.75c., and corroding, 4c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.60c.; sheet zinc, 8.75c.; Cookson's antimony, 18c. to 20c., for cask lots; other grades, 15c. to 16c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 10.50c.; copper bottoms, 9c.; copper clips, 10c.; red brass, 9.50c.; yellow brass, 7c.; lead pipe, 3c.; zinc, 3.50c.; pewter, No. 1, 24c.; tinfoil, 28c.; block tin pipe, 28c.

St. Louis

DECEMBER 21.—The non-ferrous metals, especially the Missouri product, have shown a very strong feeling during the week and closed today with lead very firm at 3.65c. to 3.70c. and spelter strong at 5.60c., with the demand for the latter, both domestic and export, quite active. Tin closed at 35.50c.; Cookson's antimony, 16c.; Lake copper, 13.50c. and electrolytic copper, 13.25c. In the Joplin ore market the demand for zinc blende was very active with prices sharply higher. The basis range for 60 per cent. metal was $50 to $51.50 per ton, with the settlement for the choicest ores running up to $54. In calamine there was active business at a basis range of $21 to $24 for 40 per cent. and the top settlements as high as $30. Lead ore was very firm at $47. Miscellaneous scrap metals are quoted as follows: Light brass, 5c.; heavy yellow brass, 7c.; heavy red brass and light copper, 8c.; heavy copper and copper wire, 9c.; tea lead, 3c.; pewter, 20c.; tinfoil, 24c.; zinc, 3c.; lead, 3c.

Schedules filed by the United Refrigerator & Ice Machine Company, Kenosha, Wis., which was thrown into involuntary bankruptcy late in November, show liabilities to be $568,578 and assets $624,810.

Iron and Industrial Stocks

NEW YORK, December 23, 1914.

The volume of business on the New York Stock Exchange has shrunken considerably, notwithstanding some of the favorable developments of last week. The announcement of the decision of the Interstate Commerce Commission, permitting Eastern railroads to advance their freight rates 5 per cent. on the greater part of their traffic, merely steadied prices, as the tenor of the decision had been previously known and discounted. The reduction in freight rates on anthracite coal to Philadelphia, ordered by the Pennsylvania Railroad Commission, which came out on Monday, had a depressing effect on almost the entire list of stocks. Bethlehem Steel stocks were notably strong. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	8½	Lackawanna Steel	28
Allis-Chal., pref.	36	Nat. Enam. & St., com.	10 - 10¾
Am. Can, com.	24¾ - 26½	Pressed St'l, com.	34 - 36⅝
Am. Can, pref.	89½ - 90⅞	Pressed St'l, pref.	100
Am. Car & Fdy., com.	44¾ - 46	Ry. Spring, com.	23 - 24
Am. Loco., com.	23 - 24¼	Republic, com.	19 - 19⅝
Am. Loco., pref.	95 - 96⅝	Republic, pref.	75 - 75⅞
Bald. Loco., com.	40½ - 40¾	Rumely Co., com.	4½ - 6
Bald. Loco., pref.	102¾	Rumely Co., pref.	21
Beth. Steel, com.	40 - 45⅞	U. S. Steel, com.	48¾ - 51⅝
Beth. Steel, pref.	84¾ - 88½	U. S. Steel, pref.	104 - 105¼
Case (J. I.), pref.	80 - 83	West'gh'se Elec.	67 - 68¾
Colorado Fuel	24¾ - 24¾	Chic. Pneu. Tool	52
General Electric	139¾ - 140½	Cambria Steel	42½ - 43¾
Gt. N. Ore Cert.	25⅞ - 27	Lake Sup. Corp.	10
Int. Harv., com.	89½ - 91	Warwick	10
Int. Harv., pref.	116¼ - 118⅛	Cruc. Steel, com.	12½ - 13
Int. Harv., Corp.	82	Cruc. Steel, pref.	80
Int. Pump	5	Harb. Walk Ref., pref.	99

Dividends

The Taylor-Wharton Iron & Steel Company, regular quarterly, 1¾ per cent. on the preferred stock, payable February 1.

The Otis Elevator Company, regular quarterly, 1¼ per cent. on the common and 1½ per cent. on the preferred stock, payable January 15.

The Washburn Wire Company, regular quarterly, 1¾ per cent. on the common and preferred stocks, payable January 2.

The American Seeding Machine Company, regular quarterly, 1 per cent. on the common and 1½ per cent. on the preferred stock, payable January 15.

The Crucible Steel Company of America has deferred action on the dividend on the preferred stock. Similar action was taken three months ago.

The Standard Coupler Company, regular semi-annual, 4 per cent. on the preferred stock, payable December 24.

The Willys-Overland Company, regular quarterly, 1¾ per cent. on the preferred stock, payable January 1.

The American Locomotive Company, regular quarterly, 1¾ per cent. on the preferred stock, payable January 21.

The Reo Motor Company, regular quarterly, 2½ per cent., payable January 1.

Chicago Railway Equipment Co. has declared regular quarterly dividend of 1¾ per cent., payable December 31, to stock of record December 19.

Manning, Maxwell & Moore, Inc., has declared the regular quarterly dividend of 1½ per cent., payable December 30, to stock of record of that date.

The N. O. Nelson Mfg. Company, St. Louis, manufacturer of plumbing supplies and of machinists' supplies and piping, has entered upon a definite foreign campaign and has sent three men to cover Latin-American countries: Alfred Piza, to the West Indies, Central America and the west coast of South America; Jose Alarco, to the east coast of South America; I. W. Johns, to cover the Pacific islands, China, Philippines, Australia and South Africa.

Arrows of pressed steel, 4 to 6 in. long, dropped from flying machines, are the latest weapon of warfare. They are known as aerial arrows and nicknamed by the soldiers, "silent death."

Pittsburgh and Nearby Districts

The annual dinner of operating officials of the Carnegie Steel Company will be held in the Hotel Schenley, Pittsburgh, January 2. Col. Henry P. Bope, vice-president, will be toastmaster and will talk on the subject of "Commercial Tendencies of Officials." John S. Unger, chief of metallurgical department, will make an address and W. G. Clyde will talk on "Personality in Salesmanship." Judge James H. Reed will have for his subject "Of the Making of Laws There Is No End." A. C. Dinkey, president, will talk on "Service."

The Cambria Steel Company has made Johnstown, Pa., a basing point instead of using Pittsburgh as heretofore. Johnstown rates to Philadelphia, New York and other Eastern points are 2c. per 100 lb. less than rates from Pittsburgh. This means 40c. per ton that the Cambria Steel Company will absorb on all Eastern freight shipments.

The Memphis Steel Construction Company, Memphis, Tenn., has bought the plant of the Noelke-Richards Iron Works, Greensburg, Pa., which has long been idle. The property includes about nine acres of land, with a structural shop, 100 x 600 ft., power plant, templet and pattern shop. The new owner will move to Greensburg its entire Memphis plant, which includes a structural steel building 150 x 300 ft. and equipment. The structural steel building now at Greensburg will be used for plate work only. The Memphis Steel Construction Company has a capitalization of $200,000, and is removing to the Pittsburgh district in order to be nearer the base of supplies. C. A. Hunt is president and general manager; Frank O'Connor, secretary and sales manager; U. J. Uhl, chief engineer. The company has established sales offices in the First-Second National Bank Building, Pittsburgh.

The Jones & Laughlin Steel Company recently bought a piece of property adjacent to its South Side works in Pittsburgh, for which it paid $73,961. The ground will be used for future extensions, plans for which have not yet been made.

The Wheeling Sanitary Mfg. Company, Wheeling, W. Va., has increased its capital stock from $25,000 to $75,000, to replace certified bonds held by stockholders with stock certificates.

Orders recently received by the Mesta Machine Company, Pittsburgh, include a 32 and 32 x 60 in. heavy duty twin Corliss engine for the Phillips Sheet & Tin Plate Company, Weirton, W. Va.; an 18 and 44 x 30 in. heavy duty dry air pump for the Carnegie Steel Company, having the air pump equipped with piston steam valves and the air cylinders with Mesta automatic plate valves, Iverson patent; a Mesta 64-in. type A barometric condenser, a 12 x 20 x 16 in. rotative crank and fly wheel type dry air pump and centrifugal circulating pump for the Cleveland Steel Company, Cleveland, Ohio, and a Mesta standard four-arm low type sheet pickling machine for the Massillon Rolling Mill Company, Massillon, Ohio. Shipment has been made of the 34 and 60 x 60 in. heavy duty tandem compound Corliss engine of the rolling mill type recently ordered by the Cleveland Steel Company. This engine will operate in connection with the Mesta barometric condenser noted above.

European Stocks of Copper

The stocks of copper in Europe, November 30, according to statistics compiled by Henry R. Merton & Co., Ltd., London, were about 31,749 tons, against 31,565, November 14; 32,116 October 31; 19,757 November 30, 1913; 34,256 November 30, 1912, and 64,682 November 30, 1911. The figures for November and the end of October, this year, are partly estimated inasmuch as the stocks in Hamburg and Bremen are given as of July 31, since when no returns have been received from those cities. The quantity in Hamburg, July 31, was 2867 tons and that in Bremen 1106 tons. The estimated amount afloat, en route to European ports, November 30, was 4000 tons. The total European arrivals from North America in the month ending November 30, 1914, are given as 15,995 tons, as compared with 28,983 in the same month last year.

PERSONAL

John A. Brashear, recently elected president of the American Society of Mechanical Engineers, talked on "An Evening with the Stars," December 16, before members of the Westinghouse Club, Pittsburgh.

Thomas Lynch, president Frick Coke Company, is dangerously ill, having been operated on in his home at Greensburg, Pa., last week for peritonitis. His condition in the past few days favors his recovery.

D. M. Buck, chief chemist of the American Sheet & Tin Plate Company, Pittsburgh, read a paper recently before a civic organization of Morgantown, W. Va., on the subject of "Influence of a Copper Content in the Corrosion of Iron and Steel."

Frederick A. Brower, 149 Broadway, New York, has been appointed New York manager of the Oswego Machine Works, Oswego, N. Y., manufacturer of machinery for cutting paper board, textile fabrics, rubber, etc.

W. S. Chase, general manager of sales, National-Acme Mfg. Company, Cleveland, Ohio, who went abroad on business a few weeks ago, has returned after a successful but trying trip. He visited England, Holland, Germany, Sweden and Norway, making his way from one country to another with more or less difficulty because of the close scrutiny to which his passport and credentials were subjected. He returned to England by way of Christiania, Norway, and the North Sea.

Samuel T. Bodine, president United Gas Improvement Company and C. Frick, son of Henry C. Frick, have been elected directors of the Cambria Steel Company to fill vacancies.

A. M. Little, superintendent of the galvanizing department of the Reeves Mfg. Company, Canal Dover, Ohio, has resigned and on January 1 will start operating the new galvanizing plant, consisting of 8 pots, of the Newport Rolling Mill Company, Newport, Ky., which will be under his supervision.

Rudolph J. Schwab, president of the R. J. Schwab & Sons Company, Milwaukee, Wis., boilers and furnaces, on December 12 celebrated his fiftieth anniversary in the foundry business. In 1864 he started as an apprentice in a small foundry at Oshkosh, Wis., establishing the present business in Milwaukee in 1876.

Hunter McDonald, president of the American Society of Civil Engineers, and Capt. Robert W. Hunt, past president, were guests December 16 at the annual dinner of the Engineers' Club of St. Louis. The new officers of the club are: W. J. Woermann, president; W. E. Rolfe, first vice-president; H. I. Finch, second vice-president; S. W. Bowen, secretary; F. I. Cutts, treasurer; L. Chevis, librarian.

Dr. David T. Day, 1331 F street N. W., Washington, D. C., whose resignation from the U. S. Geological Survey was announced recently, will devote himself largely to work in the Bureau of Mines.

The total number of freight cars ordered during 1914 up to and including December 12 is 77,620, which is equal to an annual rate of 82,000. Orders during the year were 10,000 in January, 13,000 in February, 7000 in March, 10,000 in April, 9000 in May, 15,000 in June, 6800 in July, 3100 in August, 95 in September, 1725 in October, 550 in November and 1350 for the first 12 days of December. To July 1, 1913, 114,000 cars were ordered, while in the second half only 33,000 were ordered, making a total for the year of 147,000 cars.

The total reduction in the number of male employees in the United Kingdom between July and October, according to Board of Trade reports, is 10.7 per cent. or nearly exactly equal to the percentage shown to have joined the military and naval forces. The number of those working short time, though considerable, has fallen from 26 per cent. in September to 17.3 per cent. in October.

Book Review

Export Trade Directory. Compiled under the supervision of B. Olney Hough, editor American Exporter. Pages 369, 6 x 9 in. Cloth. Publisher, the Johnston Export Publishing Company, 17 Battery place, New York. Price $3.

The fourth edition of the American Exporter's Directory for 1915 should be most favorably received, in view of its appearance at a time when the interest of American manufacturers in export opportunities is being rekindled on every side. It contains a complete list of export commission houses, foreign buyers, manufacturers' export agents, foreign exchange banks and bankers, marine insurance companies, export truckmen, foreign freight forwarders, etc., in all the principal United States ports; also foreign consulates in the United States, American consulates abroad and other data. This list, of itself, sufficiently indicates the value of the directory. There are also given in the case of each export commission house the year of its establishment, address, telephone number, cable address, codes used, branches, foreign markets and goods exported or imported, etc.

The preface of the book says: "There is no basis of fact for any belief that the commission house is a 'back number' in the scheme of exporting manufactured goods. Certainly 50 per cent., and probably as high as 75 per cent., of the export trade of the United States is handled through the medium of these commission houses, and few, if any, manufacturers will gain by striving to ignore their existence. The real change in the status of the commission house lies in the indisputable fact that these houses now have nothing like the influence in originating specific orders from their customers that they formerly had. Foreign merchants have better facilities than before for acquainting themselves with the lines made by American manufacturers, and the manufacturer, on the other hand, has better means for knowing his foreign customers, whether or not they buy through the agency of the commission house. Thus the functions of the commission house have become more and more limited to acting as buying broker and as banker for the foreign importer. As buying broker he follows the instructions of his foreign client, passing orders through to the various factories, and, where desirable, collecting goods from several factories to be dispatched together, attending to all details of consular invoices and shipment. As banker, he sometimes extends credit to his client abroad. Some confusion appears to exist in the minds of many manufacturers as to the relative position and functions of the export commission house and the manufacturers' export agent. The manufacturers' export agent, as he is properly distinguished in these pages, takes the place of a New York salesman for the factories that he represents, in so far as the export trade is concerned."

Exports of iron ore from Spain for the first nine months of this year were 5,275,047 metric tons, as compared with 6,984,838 tons in the same period in 1913. Manganese ore exports were 7908 tons to October 1, 1914, as against 22,229 tons in the same period in 1913. Exports of pig iron amounted to 16,199 tons to October 1, as compared with 6840 tons in the same period of 1913. Imports of manufactured iron and steel totaled 31,101 metric tons to October 1, 1914, as against 57,458 tons for the corresponding nine months of 1913, a decrease of 26,357 tons.

Recent statistics of the export and import trade of Russia by countries over the European frontiers for the first seven months of 1913 and 1914 show that Germany occupies a commanding position. Imports into Russia from Germany to August 1, 1914, were valued at $200,870,000 as compared with $179,127,000 to August 1, 1913. Exports from Russia to Germany for the same period were valued at $124,946,000 in 1914 and $120,071,000 in 1913. Russia's trade with no other nation approaches these figures.

Roll Design for Several Sections

German Suggestions on a Tabular Method of Laying Out Roll Passes for Channels and Z-Bars

Stahl und Eisen for August 20 contains an article by C. Holzweiler, in continuation of a previous one, on a tabular method of laying out roll passes. It gives the details on two German sections, a channel N. P. No. 23½, and a Z-bar N. P. No. 20. The design for the channel, Fig. 1, was only usable after some change. The mistake with the first layout was that the spread from 188 to 235.5 mm. in trouble. Table 1 gives the separate measurements and the ratios according to which the measurements were made. The column for the web thickness shows from No. 6 pass onward the two measurements. At No. 6 it thickens from 19 mm. to 26 mm. at the sides. Both amounts are brought to a parallel web at the last pass, with tolerably uniformly decreasing ratios.

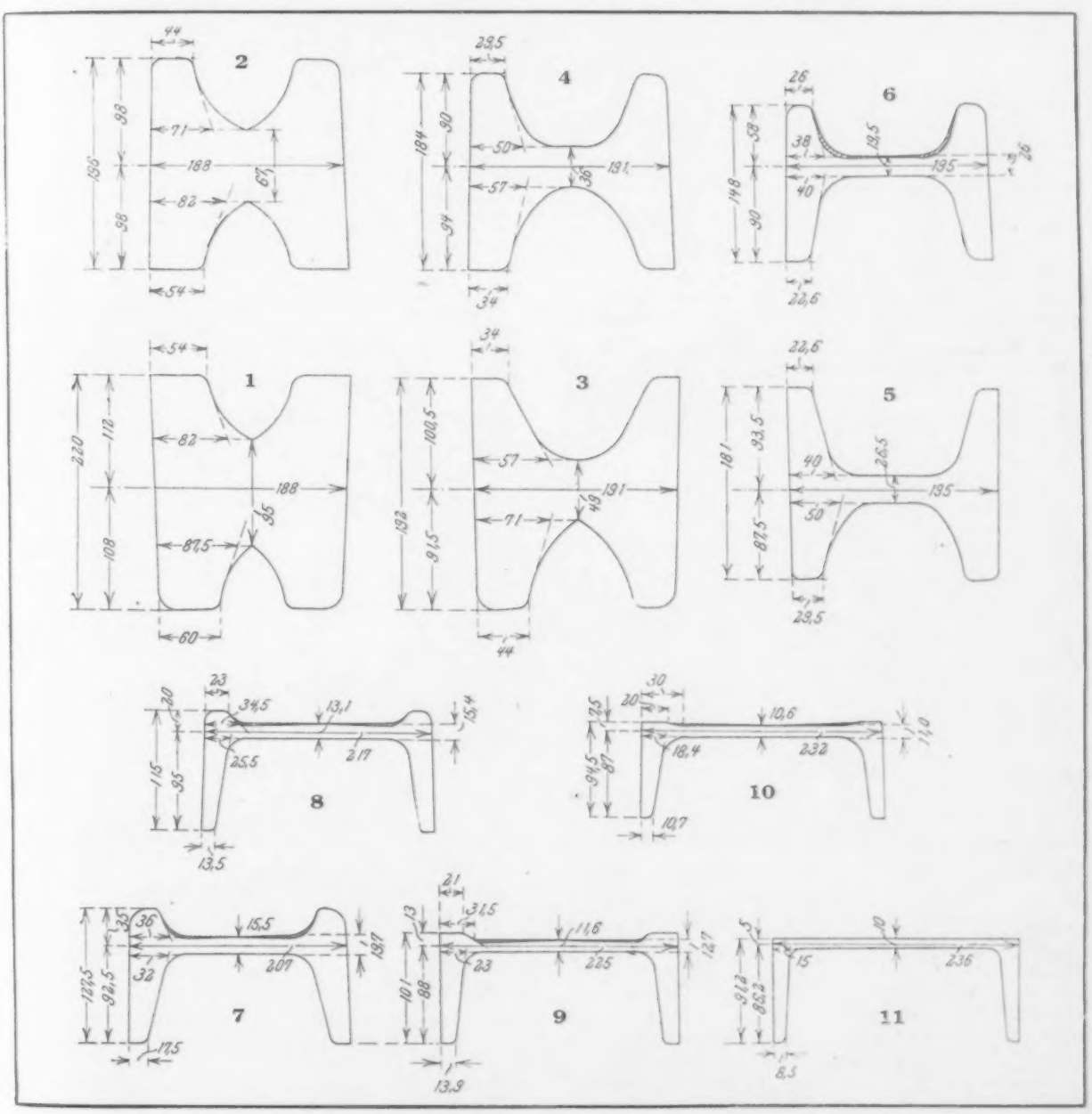

Fig. 1—Design for Channel N. P., No. 23½. Dimensions in millimeters.

eight passes was too much, and as a result the flanges were partly drawn into the web, so that they were 4 to 6 mm. too narrow. In order to meet this condition successfully the web was thickened at the sides from No. 6 pass on, as shown in the drawing, so that the metal in the web was forced to spread. After this change the section was made without

Figs. 2 and 3 show two methods of rolling Z-bar N. P. No. 20. The first is the best known, while the second has not been used much up to the present. With the design of Fig. 2 no pass can be laid over another in a three-high mill; on the other hand, with Fig. 3 the first two passes are arranged one over the other. This has the advantage that the

TABLE 1. Design for Channel, N. P. No. 23½, According to Fig. 1. Measurements in millimeters.

Pass	Web			Flanges							
	Width	Thickness	Ratio	Total hight	Ratio	Partial hight	Ratio	Thickness at web	Ratio	Thickness at free end	Ratio
Bloom	183	225	.....	225	.....	−112.5 −112.5	.....	.....	.....	.....	.....
1	188	95	+2.36	220	+1.03	B108 H112	+1.04 +1.01	B87.5 H82.0	.....	B60.0 H54.0	.....
2	188	67	+1.42	196	+1.12	H 98 B 98	+1.10 +1.15	H82.0 B71.0	+1.07 +1.16	H51.0 B44.0	+1.11 +1.23
3	191	49	+1.36	192	+1.02	B 91.5 H100.5	+1.07 −1.03	B71.0 H57.0	+1.16 +1.25	B44.0 H31.0	+1.24 +1.39
4	191	36	+1.36	184	+1.05	H 94 B 90	−1.03 +1.12	H57.0 B50.0	+1.25 +1.14	H31.0 B29.5	+1.30 +1.15
5	195	26.5	+1.36	181	+1.02	B 87.5 H 93.5	+1.08 −1.04	B50.0 H40.0	+1.14 +1.25	B29.5 H22.6	+1.15 +1.30
6	195	19.5 26.0	+1.35 +1.02	148	+1.22	H 93 B 58	−1.03 +1.61	H40.0 B38.0	+1.25 +1.05	H22.6 B26.0	+1.30 −1.15
7	207	15.5 19.5	+1.26 +1.31	127.5	+1.16	H 92.5 B 35	−1.03 +1.66	H32.0 B36.0	+1.25 +1.05	H17.5 B24.5	+1.30 +1.06
8	217	13.1 15.4	+1.18 +1.27	115	+1.11	H 95 B 20	−1.03 +1.75	H25.5 B31.5	+1.25 +1.05	H13.5 B23.0	+1.39 +1.06
9	225	11.6 12.7	+1.13 +1.21	101	+1.14	B 88 H 13	+1.08 +1.54	B23.0 H31.5	+1.11 +1.10	B13.9 H21.0	−1.03 +1.10
10	232	10.6 11.0	+1.09 +1.15	91.5	+1.07	H 87 B 7.5	+1.01 +1.74	H18.4 B30.0	+1.25 +1.05	H10.7 B20.0	+1.39 +1.05
11	236	10	+1.06 +1.10	91.2	+1.04	H 85.2 B 5	+1.01 +1.59	H15.0 B....	+1.23	H 8.5 B	+1.26 .....

H open, B closed, part of pass.

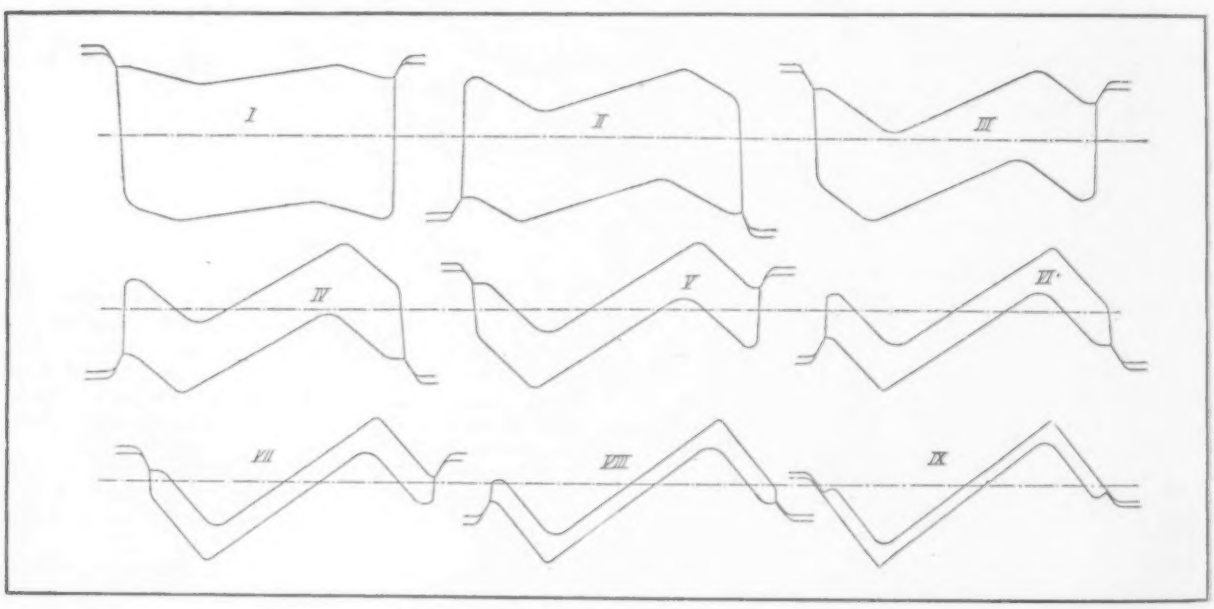

Fig. 2—Old Design for Z Bar N. P., No. 20

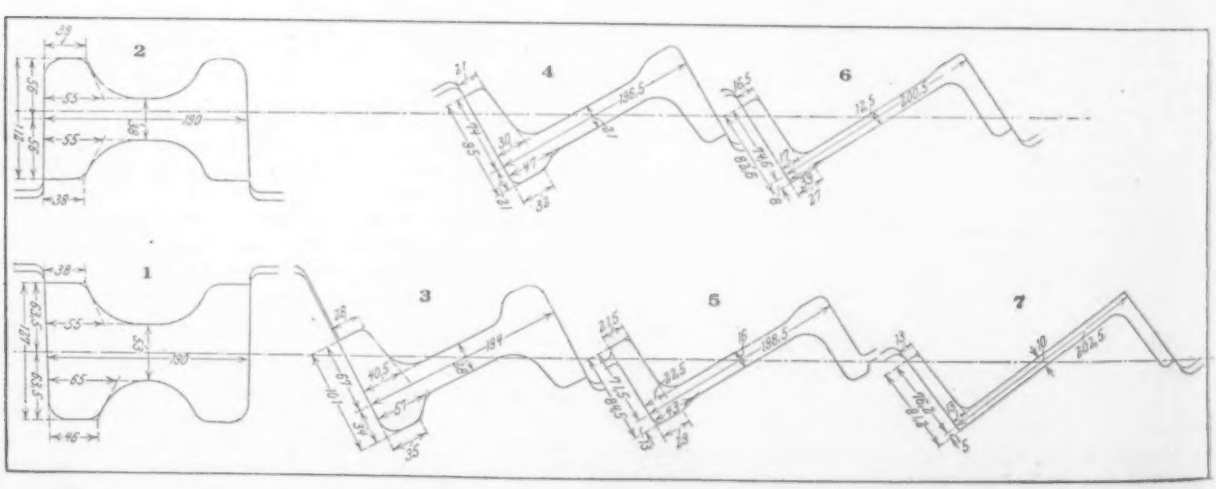

Fig. 3—New Design for Z Bar N. P., No. 20

TABLE 2. Design for 2 Bar, N. P. No. 20, According to Fig. 3. Measurements in millimeters.

Pass	Web			Flanges							
	Width	Thickness	Ratio	Total height	Ratio	Partial height	Ratio	Thickness at web	Ratio	Thickness at free end	Ratio
Bloom	185	120	.....	125	.....	62.5 62.5	.....	.....	.....	.....	.....
1	190	53	+2.27	127	−1.02	B63.5 H63.5	−1.02 −1.02	B65 H55	.....	B16 H38	.....
2	190	38	+1.40	112	+1.13	H56 B56	+1.13 +1.13	H55 B55	+1.18 =0	H38 B38	+1.21 =0
3	191	28	+1.33	101	+1.11	H67 B31	−1.20 +1.64	H40.5 B51	+1.36 +1.08	H28 B35	+1.36 +1.08
4	196.5	21	+1.33	95	+1.06	H74 B21	−1.11 +1.62	H30 B17	+1.31 +1.08	H21 B32	+1.31 +1.10
5	198.5	16	+1.30	84.5	+1.13	B71.5 B13	+1.03 +1.62	B22.5 B13	+1.33 +1.09	B21.5 B29	−1.02 +1.10
6	200.5	12.5	+1.27	82.6	+1.02	H74.6 B 8	−1.01 +1.62	H17 B39	+1.32 +1.10	H16.5 B27	+1.30 +1.07
7	202.5	10	+1.25	81.2	+1.02	H76.2 B 5	−1.02 +1.62	H13 B....	+1.30	H13	+1.27

H, open, B closed, part of pass.

passes in the second case can be arranged in one stand which was the reason why this design was made. The decrease in the number of passes from nine to seven gave no trouble. Table 2 gives the measurements of the passes for this second design.

G. B. W.

GOGGLES FOR GRINDERS*

Light Amber for Protection Against Glare of Grinding Sparks—Use of Correction Glasses

In the selection of safety glasses to meet the special requirements of each different kind of work, particular attention should be given to the requirements of grinders and especially to the requirement of grinders who must look into a steady stream of sparks in their work.

A man grinding high carbon or manganese steel looks constantly into a steady stream of sparks, the glare of which may cause retinal asthenopia. "At the back of the eye there is a sensitive lining known as the retina upon which the lens of the eye throws a sharp image of the external objects toward which the eye is directed. The retina is covered with a secretion known as visual purple, which is exceedingly sensitive to light and which in this respect is comparable with the emulsions of the haloid salts of silver used in the manufacture of photographic plates. The light waves that enter the eye through the pupil are focussed upon the retina, where they instantly set up in the visual purple a chemical action that may be likened to bleaching. By exposure to a strong light the visual purple may be so completely bleached or decomposed that the retina, at least for the time being, is unable to regenerate it. The condition thus produced is technically known as retinal asthenopia.

"Retinal asthenopia is a condition from which the eye usually recovers after a suitable period of rest, but the loss of sight may be more lasting as the result of prolonged exposure to intense glare.

"In the industrial world, retinal asthenopia is a dangerous condition, partly because of the insidious way in which it works." This quotation is from the Travelers Standard issued by Travelers Insurance Company.

A man grinding manganese or high carbon steel should be protected from the harmful glare as well as from grit and dust. The desirability of light amber colored lenses for grinders' glasses has been proved in the research laboratories of one of the largest manufacturers of grinding wheels in the world. Grinders to whom glasses with white lenses have been given have complained of strain and irritation of the eye and blamed the glasses. The strain existed before, but was not noticed until something new brought it out. At once amber lenses have been provided to cut out the harmful rays and the men have not only not objected, but have even praised the glasses which really met their requirements.

Another thing which should be given careful attention is the matter of workmen who wear correction glasses. If these lenses are unprotected they quickly become scarred by emery grit and are soon covered with spots so that they are of little use. In the past it has been a frequent sight to see workmen wearing cheap leather goggles (such as are bought in 5 and 10 cent stores, and which should never be bought for workmen) over their regular glasses. Now, when the importance of good quality glasses is recognized by all safety experts, eye protectors should be provided which can be worn over correction lenses even more easily than the old style leather dust goggle.

It seems unfair to burden a workman with placing high priced correction lenses in his safety glasses and then having him pay for the many repairs which necessarily follow. In a good sanitary grinders' goggle, which can be worn over other glasses and still provide protection from all angles, the workmen receive perfect protection and the cost of extra lenses for the eye protectors is so small that it will not be any great item of expense to the employer. Few employers wish and few employers should be forced to go to the expense of paying for high priced correction lenses set in safety frames for their men. With the new types of special grinders' goggles on the market this objectionable condition can be overcome.

*From a paper by H. W. Davie, T. A. Willson & Co., Inc., Reading, Pa.

Swedish Steel and Ore Output for Six Months

Swedish production of iron and steel for the first half of this year, according to statistics recently issued, compared with the same period in 1913 was as follows in metric tons:

	January to June	
	1913	1914
Pig iron	383,200	379,200
Puddled iron	77,700	68,600
Bessemer ingots	55,600	55,300
Open-hearth ingots	218,200	219,300

In the second quarter of this year 108 blast furnaces were in operation as against 111 in the same quarter of 1913; 199 puddling furnaces as against 210; 15 Bessemer converters as against 18; and 56 open-hearth furnaces as against 62. Exports of pig iron for the first six months of this year were 68,300 metric tons as compared with 76,600 for the same period in 1913, while of semi-finished and finished steel the exports for this period were 113,300 tons against 140,000 tons to July 1, 1913. Iron-ore exports in the first half of this year totaled 2,528,000 tons; they were 2,498,000 tons in the corresponding period of 1913.

Titaniferous Ores in the Blast Furnace

General Conclusions from the Port Henry Experiments— Two Important Discussions

An account of the results of the experiments of the MacIntyre Iron Company at Port Henry, N. Y., in smelting the extensive deposits of titaniferous iron ores of Essex County, N. Y., during the early part of this year, was published in *The Iron Age*, October 22. Since then the general superintendent in charge of this large undertaking, F. E. Bachman, presented a voluminous and detailed report of the tests at the fall meeting of the American Iron and Steel Institute at Birmingham, Ala. This report contained Mr. Bachman's conclusions, which are reproduced here together with two important written discussions by prominent blast-furnace superintendents—A. H. Lee, of the Lackawanna Steel Company, Lackawanna, N. Y., and Richard H. Lee, of the Lebanon furnaces, Pennsylvania Steel Company, Lebanon, Pa.

TABLE 1—Transverse Tests on Non-Titaniferous Cast Iron.

Cast no.	Nominal dia. in.	Breaking load, lb.	Average breaking load lb.	Ultimate deflection, in.	Analysis			
					Si.	S.	P.	Mn.
1	1.25	2,470	2,454	0.115	0.65	0.074	0.168	0.30
	1.25	2,439		0.115	0.65	0.074	0.168	0.30
2	1.25	3,260	3,260	0.20	0.75	0.09	0.128	0.31
3	1.25	2,681	2,582	0.145	1.00	0.055	0.128	0.45
	1.25	2,484		0.145	1.00	0.055	0.128	0.45
4	1.25	2,409	2,281	0.120	1.05	0.065	0.190	0.43
	1.25	2,163		0.120	1.05	0.065	0.190	0.43
5	1.25	3,372	3,347	0.135	1.05	0.074	0.142	0.37
	1.25	3,323		0.135	1.05	0.074	0.142	0.37
6	1.25	2,603	2,685	0.165	1.13	0.034	0.140	0.46
	1.25	2,768		0.165	1.13	0.034	0.140	0.46
7	1.25	2,326	2,420	0.150	1.15	0.031	0.130	0.49
	1.25	2,514		0.150	1.15	0.031	0.130	0.49
8	1.25	2,535	2,453	0.145	1.20	0.031	0.136	0.51
	1.25	2,372		0.145	1.20	0.031	0.136	0.51
9	1.25	2,620	2,620	0.15	1.21	0.049	0.195	0.50
10	1.25	3,006	3,002	0.125	1.25	0.052	0.578	0.37
	1.25	2,998		0.125	1.25	0.052	0.578	0.37
11	1.25	3,220	3,220	0.15	1.25	0.056	0.65	0.37
12	1.25	3,180	3,022	0.145	1.30	0.053	0.646	0.40
	1.25	2,864		0.145	1.30	0.053	0.646	0.40
13	1.25	3,020	3,020	0.18	1.40	0.045	0.65	0.39
14	1.25	2,800	2,800	0.15	1.40	0.058	0.284	0.45
15	1.25	3,420	3,420	0.22	1.50	0.054	0.65	0.36
16	1.25	2,906	2,885	0.150	1.55	0.024	0.145	0.49
	1.25	2,864		0.150	1.55	0.024	0.145	0.49
17	1.25	3,000	3,207	0.18	1.60	0.039	0.581	0.46
	1.25	3,415		0.21	1.60	0.039	0.581	0.46
18	1.25	3,056	3,095	0.150	1.65	0.054	0.350	0.49
	1.25	3,134		0.150	1.65	0.054	0.350	0.49
19	1.25	2,772	2,918	0.13	1.80	0.032	0.581	0.46
	1.25	3,065		0.13	1.80	0.032	0.581	0.46
20	1.25	2,580	2,790	0.19	1.80	0.034	0.272	0.49
	1.25	3,000		0.19	1.80	0.034	0.272	0.49
21	1.25	2,961	2,878	0.125	1.95	0.036	0.578	0.42
	1.25	2,796		0.125	1.95	0.036	0.578	0.42
22	1.25	3,022	2,965	0.135	2.05	0.034	0.581	0.44
	1.25	2,908		0.135	2.05	0.034	0.581	0.44
23	1.25	3,036	3,025	0.150	2.10	0.025	0.145	0.57
	1.25	3,015		0.150	2.10	0.025	0.145	0.57
24	1.25	2,730	2,739	0.20	2.20	0.021	0.58	0.48
25	1.25	2,800	2,850	0.21	2.40	0.023	0.56	0.50
	1.25	2,900		0.17	2.40	0.023	0.56	0.50
26	1.25	3,269	3,269	0.19	2.40	0.027	0.584	0.50
27	1.25	3,060	3,060	0.14	2.45	0.031	0.578	0.49
28	1.25	2,740	2,740	0.16	2.65	0.019	0.569	0.46
29	1.25	2,890	2,765	0.23	2.90	0.021	0.571	0.52
	1.25	2,640		0.16	2.99	0.021	0.571	0.52
30	1.25	2,565	2,565	0.16	3.05	0.019	0.584	0.55

Mr. Bachman's Conclusions

In a general way the conclusions which I am able to draw from the experimental run, short as it was, are:

Titaniferous concentrates are reduced in the furnace with no greater and probably with less expenditure of heat, and consequently of fuel, than non-titaniferous magnetites, and as a greater proportion of their oxygen is removed by the action of CO than is the case with non-titaniferous magnetites, a lower fuel consumption for the reduction of the iron may be expected. The slower driving of the furnace for the same wind blown seems to be explicable only on the assumption that more carbon was burned in the hearth and less in the upper portions of the furnace. With proper concentration, Sanford ore should be produced containing iron from 58 to 60 per cent., and from 9 to 10 per cent. TiO_2.

The weight of slag produced per ton of iron from an ore of this composition will be slightly greater than that produced from the average magnetic concentrate containing 62 to 63 per cent. of iron. This additional slag production will about counterbalance the reduced fuel consumption necessary for the reduction of their iron contents. The slags produced will be of much greater fluidity than those produced when TiO_2 is not present. The operation of the furnace above the tuyere level will be more uniform and there will be less tendency to hang and slip. The iron produced will contain less sulphur. Its silicon contents will be lower by an amount equal to one-half of the titanium content. With titanic acid in the slag in excess of 6 per cent. the production of high silicon iron, that is iron containing over 2 per cent. silicon, will be more difficult The titaniferous ore being low in silica is not adapted for the production of high silicon iron. At least until further investigation is made, there is likely to be a tendency to periodical "dirty hearth" conditions in the working of the ore, but they are

TABLE 2—Transverse Tests on Titaniferous Cast Iron.

Cast no.	Nominal diameter, in.		Breaking load, lb.	Average breaking load lb.	Ultimate deflection, in.	Analysis					
	wdh.	hgt.				Si.	S.	P.	Mn	Ti.	V.
743	1.36	1.33	3,059	3,020	0.095	0.65	0.046	0.184	0.41	0.246	0.058
743	1.31	1.30	2,982			0.65	0.046	0.184	0.41	0.246	0.058
791	1.30	1.30	2,417	2,564	0.135	0.70	0.030	0.149	0.39	0.399	0.085
791	1.28	1.30	2,712			0.70	0.030	0.149	0.39	0.399	0.085
1,039	1.28	.....	3,100	3,050	0.172	0.70	0.041	0.120	0.42	0.350	0.106
1,039	1.28	.....	3,000		0.180	0.70	0.041	0.120	0.42	0.350	0.106
795	1.28	.....	2,800	2,730	0.152	0.72	0.026	0.148	0.43	0.498	0.080
795	1.28	.....	2,660		0.147	0.72	0.026	0.148	0.43	0.498	0.080
845	1.28	.....	3,680	3,420	0.154	0.75	0.030	0.226	0.53	0.390	0.085
845	1.28	.....	3,160		0.137	0.75	0.030	0.226	0.53	0.390	0.085
754	1.26	1.26	3,462	3,543	0.115	0.77	0.029	0.152	0.47	0.493	0.071
754	1.26	1.27	3,624			0.77	0.029	0.152	0.47	0.493	0.071
765	1.27	1.26	2,624	2,624	0.135	0.80	0.026	0.148	0.55	0.555	0.074
773	1.27	1.26	3,165	3,076	0.135	0.80	0.031	0.142	0.56	0.471	0.077
773	1.27	1.26	2,988			0.80	0.031	0.142	0.56	0.471	0.077
735	1.30	1.30	3,019	2,874	0.150	0.80	0.028	0.166	0.47	0.436	0.048
735	1.29	1.28	2,730			0.80	0.028	0.166	0.47	0.436	0.048
802	1.28	.....	3,000	3,000	0.174	0.82	0.027	0.128	0.46	0.430	0.082
850	1.28	.....	3,560	3,515	0.155	0.85	0.037	0.216	0.56	0.417	0.079
850	1.28	.....	3,470		0.141	0.85	0.037	0.216	0.56	0.417	0.079
737	1.27	1.26	2,883	2,857	0.135	0.90	0.040	0.178	0.45	0.356	0.048
737	1.28	1.28	2,832		0.159	0.90	0.040	0.178	0.45	0.356	0.048
939	1.28	.....	3,020	3,040	0.155	0.90	0.049	0.192	0.35	0.328	0.082
939	1.28	.....	3,060			0.90	0.049	0.192	0.35	0.328	0.082
742	1.28	1.27	3,226	3,184	0.125	0.94	0.027	0.182	0.31	0.410	0.058
742	1.27	1.27	3,142			0.94	0.027	0.182	0.31	0.410	0.058
852	1.28	.....	3,050	3,050	0.131	0.97	0.040	0.216	0.53	0.417	0.079
741	1.26	1.27	2,921	3,009	0.140	1.00	0.033	0.180	0.41	0.426	0.058
741	1.26	1.27	3,097			1.00	0.033	0.180	0.41	0.426	0.058
849	1.28	.....	3,080	3,080	0.128	1.00	0.031	0.222	0.51	0.417	0.079
1,016	1.28	.....	3,190		0.146	1.00	0.036	0.172	0.44	0.410	0.093
1,016	1.28	.....	3,470	3,330	0.166	1.00	0.036	0.172	0.44	0.410	0.093
1,017	1.28	.....	2,780	2,390	0.164	1.00	0.059	0.150	0.36	0.410	0.093
1,017	1.28	.....	3,000		0.156	1.00	0.059	0.150	0.36	0.410	0.093
955	1.28	.....	3,165	3,147	0.138	1.10	0.011	0.322	0.17	0.319	0.080
955	1.28	.....	3,130		0.145	1.10	0.011	0.322	0.17	0.319	0.080
963	1.28	.....	3,460	3,357	0.151	1.10	0.012	0.394	0.17	0.336	0.077
963	1.28	.....	3,255		0.151	1.10	0.012	0.394	0.17	0.336	0.077
947	1.28	.....	2,310	2,310	0.120	1.15	0.014	0.290	0.21	0.333	0.080
1,028	1.28	.....	3,130	3,145	0.175	1.15	0.040	0.160	0.46	0.440	0.108
1,028	1.28	.....	3,160		0.169	1.15	0.040	0.160	0.46	0.440	0.108
767	1.26	1.27	2,727	2,815	0.135	1.20	0.020	0.144	0.57	0.668	0.074

readily stopped by the removal of titaniferous ore from the mixture for short periods.

PROPERTIES OF THE IRON

Tables 1 and 2 give physical tests of a series of test bars which were cast from iron as it flowed from the furnace. These bars were made in accordance with the standard specifications for gray iron castings of the American Society for Testing Materials, with the exception that the molds were not dried. The bars were broken in part by the Titanium Alloy Mfg. Company, Niagara Falls, N. Y., and in part by the United States Bureau of Standards. It will be noted that the titaniferous iron averages stronger than non-titaniferous iron of the same silicon content.

Samples of pig iron made from all Lake ores by a furnace in the Buffalo district were obtained, test bars, shrinkage and chill tests were made from them and from titaniferous iron of the same silicon content. The pig was melted alone, with 50 per cent., and in the case of titaniferous iron with 70 per cent., of stove plate scrap. The sample of non-titaniferous iron was not of sufficient quantity to make tests from it with 70 per cent. of stove plate scrap. The strength of the bars made from the titaniferous pig was higher than that from the non-titaniferous pig, with one exception. The shrinkage of both irons was practically the same. The chill from the titaniferous iron was distinctly less than that from the non-titaniferous iron. It carried 70 per cent. scrap with no greater chill than the Buffalo iron had with 50 per cent. The loss of titanium in remelting was quite apparent, although it was less than was expected. The loss of vanadium was considerably less. The stove plate scrap used contained some vanadium, qualitative examination of it also shows that it contained titanium, quantitative examinations were not made. The irons for these tests were melted in a graphite crucible in a coke furnace somewhat similar to a steel melting furnace. The stove plate scrap used was broken into very small pieces and thoroughly mixed in the pile, so that it was practically uniform in composition.

It is interesting to note that all pig iron made from Connellsville coke, which I have examined, contained appreciable amounts of titanium and vanadium.

Reference to the titanium content of iron produced indicates that the titanium content of the iron is not directly proportionate to the titanium in the charge. It does not directly follow the silicon or the sulphur. The vanadium content of the iron is more nearly proportionate to the amount charged, but not entirely so.

TITANIUM IN FOUNDRY IRON

The foundry iron produced in February was shipped to customers with the request that they report the results from its use. In most cases the customers failed to respond to our request. In no case did they report unfavorably. Where reports were made, they were either that the iron increased the strength of their mixture without hardening it, or that they did not notice any change in the quality of their castings. One customer reported that the use of 20 per cent. of titaniferous iron in his mixture gave him the strongest test bar he had ever broken, and that the increased strength over his average test bars was 23 per cent. One sample lot of the iron was puddled, the report on it being that no difference from ordinary iron was noted either in its working in the puddle furnace or in the bars produced. Two customers using the iron for malleable castings advise that preliminary tests show that the iron is not different from similar malleable irons, either in its working or in the quality of the finished castings.

Table 3 gives the average monthly results of furnace operation from January, 1913, to July, 1914, inclusive, affording a ready comparison of operations on titanium and non-titanium-bearing ores.

TABLE 3.—Average Monthly Results of Furnace Operation, January, 1913 to July, 1914.

Mo.	Coke, lb.	Stone, lb.	Marble, lb.	Ore, lb.	Tons of iron made	Tons of iron remelted	Yield of ore, per cent.	Lb. of coke per ton of iron	Lb. of stone per ton of iron	Lb. of ore per ton of iron	Lb. of coke per lb. ore	Lb. coke per lb. ore, stone and marble	Theoretical yield, per cent.	Actual yield, per cent.	Tons pig lost in flue dust	Per cent. pig lost in flue dust	Per cent. of iron made with silicon: below 1.25	1.25 to 2.00	above 2.00	Per cent. of iron made with sulphur above .05
1913																				
Jan.	18,318,300	3,267,400	3,269,150	21,943,980	6,431	292	62.8	2,658	1,065	3,574	1.344	1.745	.....	.....	.....	.....	7	17	75	13
Feb.	12,960,800	3,139,810	3,139,810	19,035,935	5,674	413	61.9	2,463	1,194	3,618	1.469	1.953	.....	.....	.....	.....	44	53	2	22
Mar.	14,013,550	2,831,860	2,831,860	19,173,666	6,010	496	64.3	2,541	1,027	3,477	1.368	1.772	.....	.....	.....	.....	8	48	41	8
Apr.	13,164,800	2,644,610	2,644,610	19,946,520	6,112	60	67.9	2,175	874	3,296	1.515	1.917	.....	.....	.....	.....	12	66	20	7
May	14,060,700	2,817,230	2,817,230	20,816,906	6,159	390	62.9	2,439	977	3,561	1.480	1.881	.....	.....	.....	.....	40	37	22	10
June	13,260,000	2,724,550	3,522,870	19,850,580	5,757	481	61.1	2,518	1,184	3,666	1.497	1.968	.....	.....	.....	.....	70	28	..	11
July	12,421,900	2,605,360	2,605,360	18,768,345	5,444	80	67.5	2,316	971	3,318	1.511	1.930	.....	.....	.....	.....	42	54	1	1
Aug.	11,717,100	2,272,530	2,272,530	15,846,523	4,831	263	67.1	2,575	995	3,335	1.352	1.740	.....	.....	.....	.....	10	86	4	1
Sept.	13,953,000	2,564,010	3,410,730	20,235,029	6,440	1,552	54.1	2,854	1,049	4,140	1.450	1.878	.....	.....	.....	.....	30	66	3	8
Oct.	14,899,225	4,349,245	3,498,160	21,159,770	6,307	768	58.6	2,689	1,417	3,820	1.420	1.947	.....	.....	.....	.....	42	56	..	8
Nov.	17,179,995	2,977,120	4,282,200	17,366,870	6,539	591	76.7	2,887	963	3,669	1.449	1.821	.....	.....	.....	.....	3	35	59	10
Dec.	16,955,510	581,285	4,869,417	24,648,510	8,175	988	65.3	2,359	661	3,429	1.454	1.775	.....	.....	.....	.....	5	34	60	5
Total	172,904,880	32,775,010	39,163,927	238,792,634	73,879	6,374	63.33	2,532	1,066	3,537	1.397	1.818	.....	.....	.....	.....	.....	.....	.....	.....
1914																				
Jan.	16,260,525	2,183,710	2,707,340	22,569,258	6,775	644	61.79	2,400	722	3,625	1.387	1.688	64.85	60.20	461.56	7.17	10	25	65	10
Feb.	14,432,039	2,319,670	2,438,670	20,531,070	5,857	259	61.89	2,464	812	3,619	1.404	1.733	64.005	61.89	354.06	6.12	..	20	79	2
Mar.	11,430,600	2,136,860	2,136,860	16,308,840	4,984	339	64.85	2,293	857	3,454	1.403	1.777	65.389	64.59	236.77	5.06	2	39	54	3
Apr.	4,876,920	908,130	908,130	6,624,295	1,756	37	58.83	2,777	1,034	3,807	1.342	1.714	64.54	58.83	71.77	3.76	..	28	41	4
May	16,327,700	2,569,465	4,075,195	22,950,289	6,690	386	62.25	2,440	993	3,598	1.389	1.796	65.41	61.98	250.66	3.78	9	36	31	20
June	13,896,370	1,908,735	4,390,345	19,874,830	5,983	957	57.45	2,322	1,052	3,898	1.409	1.863	64.54	57.45	341.50	6.05	76	16	1	5
July	13,950,507	3,091,130	2,278,150	19,523,330	5,844	660	60.00	2,387	919	3,733	1.387	1.772	64.638	59.95	316.40	5.53	35	36	6	21
Total	91,174,661	15,117,700	18,934,690	128,381,912	37,889	3,282	61.01	2,440	912	3,676	1.389	1.763	.....	.....	.....	.....	.....	.....	.....	.....

Discussion by A. H. Lee

Mr. Bachman has treated a subject in which he alone has had practical experience on a commercial scale. The test that he made seems to have been carried on in a thorough and systematic way. My own experience is limited to a one day visit to Port Henry, N. Y., when Mr. Bachman was making his test; and a period a number of years ago at the Scranton furnaces when we used large amounts of

Adirondack ores which contained very small percentages of titanium, so that I cannot give much except my opinion.

The subject of the use of titaniferous ores is sure to come to the front in the near future, on account of the large bodies of this ore which have never been mined. In 1890, or thereabouts, Rossi made some experiments on a small scale, which showed there was no trouble in using ores containing as high as 35 to 40 per cent. TiO_2. Shortly after that, due to the development of the Lake Superior ores which seemed inexhaustible, the subject was dropped until Mr. Bachman's experiment at Port Henry.

The exhaustion of high grade ores low in phosphorus in the Lake district will eventually bring about the use of titaniferous ores, which as a rule are apt to run very low in phosphorus. Until recently ores containing over 1 per cent. titanium were supposed to be troublesome, due to the belief, which was based on incomplete observation and hearsay, that high fuel was needed, and infusible compounds were formed which built up the furnace hearth. In early days ores containing titanium were used in small charcoal furnaces and it seems it made no difference whether the ores had much or little titanium. As furnaces got larger and charcoal was difficult to obtain, and as ores high in titanium were lower in iron, richer ores were used with better results, which at that time was naturally credited to the dropping out of the titanium. This prejudice grew so that furnace men fought shy of titaniferous ores, especially as soft and easily reducible Lake ores were so readily obtained.

EARLIER EXPERIENCE WITH TITANIUM ORES

In Scranton, Pa., during the eighties, the Lackawanna Iron & Steel Company used large quantities of magnetic ores from the Adirondack region, which contained varying small percentages of titanium. The titanium in the ore invariably was plainly evident in the salamander when the furnace was blown out. Our furnaces were all troubled then with high bottoms, which we blamed to the deposits of infusible compounds. This was before the days of fast driving, when all furnaces, especially those which used anthracite coal, as we did, had high bottoms. In the nineties, when we used a large percentage of coke and drove the furnaces faster, the furnace bottoms cut out. We then wished that we had some high titaniferous ores to build them up and stop breakouts. Since that time I have often thought that in a modern blast furnace titaniferous ores would not give any trouble, and after my visit to Port Henry last July, where I saw that furnace working on 25 per cent. of an ore containing 13 per cent. TiO_2, I am thoroughly convinced that no trouble would result from working these ores, and that the TiO_2 in the ores should be treated as SiO_2, in the ratio of 100 parts TiO_2 being equal to 75 parts SiO_2.

Referring to Mr. Bachman's report, his laboratory experiments, showing the relative reducibility of ores, are very interesting. The melting points of slags with different amounts of TiO_2 under conditions not as favorable as obtained in a blast furnace, show that the slags were not infusible, as had been erroneously supposed. In the test the furnace would probably have worked smoother, from our experience here, if it had eight tuyeres evenly spaced instead of 12, and a deeper hearth. The furnace seems to have been in poor shape when the test was started, which accounts for a lot of the trouble which occurred from time to time. This, to my mind, was a good thing for a fair test, because if the ore was difficult to handle, these troubles would have been magnified, and yet the reverse seems to be true.

The troubles Mr. Bachman speaks of, such as dirty hearth and cinder about the tuyeres, are those which other furnaces are liable to, due to various causes not chargeable to titaniferous ores. The conclusions which he comes to in summing up his report, I thoroughly agree with, as they seem logical from the complete data which he gives.

Discussion by R. H. Lee

When I was in Colorado there was in the stockyard a pile of titanic ore which had been brought there many years before. It had been accused of giving trouble in the furnace, and the use of it had been discontinued. Some of the ore was used at various times by Mr. Nau for "fixing" the puddle furnaces, and a great amount of it was finally used in foundations.

The air in Colorado is so dry that all ores in the stockhouse lose the greater part of their moisture. In operating, the ore piles always show a great loss in weight compared with the weight as shipped from the mines. When a pile was approaching exhaustion, the custom was to fill more or less flue dirt in the burden and charge it as ore, to make the amount used correspond roughly to the original weight received.

On one occasion it occurred to us to try to use up the pile of titanic ore which had been charged off the books many years before. This ore was a magnetite running about 35 per cent. in iron, and 12 per cent. in SiO_2. A small quantity, one buggy in a charge of twelve, was put on the furnace. In a day or two, for some cause or other, the furnace went off. This frequently happened and always from the same cause, irregular coke. But the titanic ore, while not blamed for the change, was under suspicion and was taken off.

Some months afterward, the same ore conditions coming up again, I decided to try the experiment again and to keep it up regardless of any changes that the furnace might make, because I was convinced that the soft and irregular coke made all the trouble we ever had with the furnaces and that more or less titanic ore would make no appreciable difference. I had read with a great deal of interest M. Rossi's experiments with titanic ores, which at that time was all the literature of any value on the subject, and decided to consider the TiO_2 simply as an acid along with the SiO_2 and Al_2O_3 and flux accordingly.

Except when making low sulphur iron the slag we usually ran on was a 48 per cent. SiO_2 and Al_2O_3 slag, and consequently that proportion of acids was kept. As such a slag is fusible, if the TiO_2 had a tendency to increase the refractoriness there was some margin to go on. Small amounts were used in the charge until I was convinced that the TiO_2 was not making any apparent difference in the general working. Then I used greater quantities for different lengths of time, sometimes charging seven or eight buggies, always being careful in every increase not to keep it on so long that the furnace could not be easily brought around if things went badly.

FLUXING THE TITANIUM AS AN ACID

I was very curious to know whether the TiO_2 was as difficult to work as was generally supposed, but never found any particular difference in the working of the furnace both in the regular ores and when

on the SiO_2 mixture. The furnace was blown up to the capacity of the blowing engines. These were the S. P. Morris type and very old; 25,000 cu. ft. engine measurement was about as much as could be gotten out of them, and the pressure could only go to 8 lb. without stalling them. The furnace was 10 ft. hearth, 17 ft. bosh, and 75 ft. high. The great point in working titanium ores, I believe, is to regard the TiO_2 as an acid and flux it instead of only fluxing the SiO_2 and Al_2O_3. The sulphur in our coke was only 0.60 per cent., so that an acid and fusible cinder could always be used. And I judged that the TiO_2 could raise the melting point of the cinder considerably without giving trouble. The slag was always fluid, nor did there seem to be any bottoming. The tendency, if any, was the other way.

The ore, however, differed very greatly from that used at Port Henry. Although a magnetite, it was mostly in lumps the size of a man's fist, or a little larger, or else in fine soft particles somewhat similar to old range lake ores, or the fines from Cornwall ore, which offer hardly any resistance to the passage of the furnace gases. No screen tests were made, as they were not necessary with the Colorado ores. Mr. Bachman's ores were much finer, and the fine particles have a tendency to pack among the interstices of the coke, making it difficult to get good penetration and distribution of the gases through the mass.

The hanging of the cinder around the tuyeres and generally dirty hearth conditions which he describes are often met with in working 100 per cent. nodulized concentrates from Cornwall ores, when from heavy burdens or unusually fine nodules the melting point in the furnace is brought down too close to the tuyeres. In such cases, while the iron is hot, the furnace will not drive, and things are generally just about what he described at Port Henry. I have found that in these conditions giving the furnace more wind and lightening the burden are the only means of getting relief. From a number of these experiences in working nodules we have learned the importance of getting the melting point just right, and this condition probably exists with the mixture of Port Henry magnetites and Sanford ore.

From the experiences I have had, I thoroughly agree with the conclusions that Mr. Bachman has so well worked out as to the commercial feasibility of using titanic ores in the blast furnace. I believe, also, that in working titanic ores the presence of MgO in the slag will be found to be necessary.

The Dodge Mfg. Company, Mishawaka, Ind., has issued an impressive list of deliveries just made of power transmission machinery. These deliveries cover all sections of the country and comprise important installations of rope drives, shafting equipment, transmission, fittings, etc. Among the deliveries made was one to the Inspiration Consolidated Copper Company, Miami, Ariz., comprising equipment amounting to $7300, which includes shafting and about 25 split clutches for the crushing plant. To S. Slater & Sons, Webster, Mass., an order was filled amounting to about $7000 for shafting, flange couplings, hangers and 847 split iron pulleys.

The Tait & Nordmeyer Engineering Company, St. Louis, has been awarded the contract for erecting a refrigerating plant at Shanghai, China, at a cost of about $500,000. L. C. Nordmeyer will have charge of the work and will start for China about January 15. The plant is to be erected within eight months. All the material is to be shipped from the United States except the lumber required.

TATA IRON & STEEL COMPANY

Gain in Steel Operations—New Koppers Coke Ovens—Cheap Labor Costs

The annual report of the Tata Iron & Steel Company, Ltd., of India, for the year ended June 30, 1914, calls attention to the improvements in the quality and output of the steel whereby the Indian Government contract for rails is practically completed for the current fiscal year. Mention is made of the trip of Mr. Padshah, the company's agent in India, to the Pacific coast of the United States, and to China, Japan and the Philippines, in company with C. P. Perin, to establish connections for the sale of the company's product. Because of the war it was expected that the German engineers and others at the works at Sakchi would return to their homes, but a combination of circumstances has kept the entire staff at the plant.

Exploration during the year has resulted in the locating of areas containing magnesite and chromite, warranting the hope that magnesite brick for the open-hearth furnaces may be manufactured in India. The sinking of test pits has resulted in revising the figures for the Gurumaishini ore deposits, indicating 50 per cent. more iron ore than was originally calculated. Deposits of fluorspar are being investigated in Rajputana. The annual consumption of imported firebricks is 1½ million; deposits of fire clay and silica have been examined and analyzed and it is probable that the company will soon manufacture its own brick.

A contract has been entered into for the installation of 50 Koppers regenerative by-product coke ovens so arranged that a battery of 50 more can be added. The company is now buying its own tar and gas coal to make gas, its 180 Coppeé coke ovens being of the non-recovery type.

LOW COSTS DUE TO 8-CENT LABOR

The London Iron and Coal Trades Review gives the following interesting data concerning costs and output at Sakchi: Basic iron is being produced for approximately 25s. ($6.09) per ton, including mining, assembling and smelting charges. The ingot cost for the current year is estimated at about £3 ($14.60) per ton. The output is at present at the yearly rate of about 150,000 tons of pig iron, 110,000 tons of ingots and 75,000 tons of finished material. The average phosphorus and sulphur content of the steel made in the year ending June 30, 1913, was 0.037 and 0.027 per cent. respectively.

Iron ore can be placed in the blast furnace stock house at the low figure of 0.375d. (0.75c.) per unit. The ore runs about 61 per cent. iron and 0.08 per cent. phosphorus. The production of the company's Gurumaishini iron mines was 236,718 tons in the year ending June 30, 1913.

Cheap labor is the explanation of the low costs. Recently the employees of the plant totaled 7000 natives and 168 foreigners, mostly Germans, Englishmen and Americans. The native men receive about 4 annas (8c.) daily, and the women 3½ annas (7c.). The open hearth plant is run by a German crew, while in the rolling mills the English predominate. The total wages of the 168 Europeans and Americans in the plant is computed to be within 15 to 20 per cent. of the aggregate sum paid to the 7000 natives.

The entire stock of the C. C. Wormer Machinery Company, 97-101 Woodbridge street, West Detroit, Mich., is to be disposed of at a liquidation sale conducted January 19, 20 and 21 by Samuel T. Freeman & Co., auctioneers, 1519 Chestnut street, Philadelphia. The stock consists of machine tools for iron and wood working, shafting, hangers, pulleys, chucks, high-speed steel, small tools, etc. The sale will take place in Detroit.

The Goulds Mfg. Company, manufacturer of Triplex, centrifugal, hand and spray pumps, Seneca Falls, N. Y., announces the opening of a new office in Atlanta, Ga. It is located in the Third National Bank Building and is in charge of O. B. Tanner as district manager.

OBITUARY

Lyman F. Gordon

Lyman Francis Gordon, president and treasurer of the Wyman & Gordon Company, Worcester, Mass., died December 20, aged 53 years. He had been in poor health for some time. He was born in Worcester, receiving his degree in mechanical engineering from the Worcester Polytechnic Institute in 1881. Following graduation he was connected for a year with the engineering department of the United States Central Railroad, in California, and afterward was with F. A. Robbins & Co., San Francisco, manufacturers of presses and dies. In 1883 he returned to Worcester, and formed with the late H. Winfield Wyman the partnership of Wyman & Gordon, for the manufacture of drop forgings.

The industry in which the firm embarked was then in its infancy. Specialties of original design in the way of small tools were made, which found customers for forgings among the builders of textile and other machinery and in a small way the railroads. The bicycle business gave the firm a strong impetus, and rail bonds for electric railroads became an important specialty and remained so until the department was disposed of.

LYMAN FRANCIS GORDON

The automobile industry made Wyman & Gordon famous. The partners early realized the possibilities of the motor car and its exacting requirements, and developed to a high degree of efficiency the science of working by drop hammer and hydraulic press such parts as crankshafts and steering knuckles, together with the best treatment of the metal. The business has grown rapidly, and the works in Worcester and in Cleveland have increased in size accordingly. Mr. Gordon had very much to do with the success of the industry, in both the sales and the manufacturing ends. On the death of Mr. Wyman, the business was incorporated as the Wyman & Gordon Company. George F. Fuller has been the works head of the business as general manager for some years, and not long ago Harry G. Stoddard became associated with the company as vice-president and general sales manager.

Mr. Gordon was prominent as a churchman, and was a director of the Merchants' National Bank, Worcester; member of the American Society of Mechanical Engineers, Worcester Chamber of Commerce, Cleveland Chamber of Commerce, Union Club of Cleveland and Worcester Club and Tatnuck Country Club of his home city. He leaves his widow and two sons. His parents are still living. Albert A. Gordon, Jr., superintendent of the Crompton & Knowles Loom Works, Worcester, and George C. Gorden, manager of the Parks Drop Forge Company, Cleveland, are brothers.

ARTEMUS N. HADLEY, Indianapolis, Ind., died December 13, aged 72 years. Born on an Ohio farm, he became a prolific and almost invariably successful inventor and an expert mechanic. He was a graduate of Earlham College and started in the machinery business at Richmond, Ind., where for many years he operated the Quaker City machine works, then moving the plant to Indianapolis and subsequently selling it to the Nordyke & Marmon Company, which still operates it. He next became interested in the firm of Hadley & Wright, manufacturers of general machinery, and brought out several inventions pertaining to textile machinery, steam engines, underdraining machinery, etc. He was the first to design and build a practical corn-shocking machine. The Commercial Electric Company was organized and operated by Mr. Hadley and his associates for many years. It was acquired by the Fairbanks-Morse Company and is now operated under that name. His services had been in demand for many years throughout the United States and other countries by institutions which have use for expert mechanical knowledge. At the time of his death he was president of the Hadley Mfg. Company, a corporation of $2,500,000 authorized capital stock, with offices at Indianapolis and New Orleans, controlling Hadley inventions of power traction machines for the planting and cultivating of corn and other grain and planting, raising and harvesting sugar cane. He leaves his widow, a son and two daughters.

HENRY B. SHIELDS, who was a prominent figure in the Mahoning Valley iron industry for many years, died at Steubenville, Ohio, December 13, aged 69 years. He held the office of county clerk at Youngstown in the late eighteen-seventies and in 1881 became manager of Mattie furnace of the Girard Iron Company at Girard, Ohio, a subsidiary of the A. M. Byers Company, Pittsburgh. In 1901 he and others organized the Continental Iron Company, Niles, Ohio, of which he was president. He had not been atcive in the iron trade in recent years.

GEORGE R. STEWART, secretary of the Interstate Iron & Steel Company since its organization, died December 18, at the Presbyterian Hospital, Chicago, aged 69 years. He had been active in many manufacturing enterprises, having founded the Marion Pulp & Paper Company. He was also connected with the Westerman Natural Gas Iron Company. He leaves his widow, a son and daughter.

WILLIAM J. WALKER, principal owner and manager of the William J. Walker Company, Cleveland, Ohio, jobber in cold-rolled strip steel, died December 16, after a short illness. Before he became engaged in the strip-steel jobbing business, about eight years ago, he was for many years superintendent of the rolling mills of the Otis Steel Company, Cleveland.

JACOB FOX, Philadelphia, died December 20, aged 60 years. In 1880 he organized the Philadelphia Sash-weight Company, and has since been at the head of the business, which is located at Twenty-second street and Glenwood avenue. He leaves his widow, two sons and two daughters.

HERMAN SMITH, vice-president of the Smith & Watson Iron Works, Portland, Ore., died of pneumonia at Seaside, Ore., December 4, aged 35 years. He graduated at Leland Stanford University and afterward spent several years in the East in the study of engineering.

MORRIS G. CONDON, senior member of the firm of H. B. Underwood & Co., Philadelphia, died December 3.

EXPENSIVE NAVY YARD WORK

Government Showing of Economies Purely a Matter of Bookkeeping

WASHINGTON, D. C., December 21, 1914.—Considerable light is shed upon the system of accounting whereby the Government has been able to figure that warships could be built in the navy yards at less than cost of construction at private plants, by the annual report of the Secretary of the Navy, just made public. It is frankly stated by Secretary Daniels that the ability of the navy yards to make a better showing in this regard today than was made when the battleship Connecticut, constructed in the Brooklyn Yard, was officially reported as having cost 25 per cent. more than her sister ship, built by private contract, is in no wise due to improved methods of construction or economies of any kind, but merely to a different system of bookkeeping. Construction of ships in navy yards, the Secretary says, "was discouraged formerly because, by an unwise system of accounting, overhead charges, in no-wise properly chargeable against new construction, were added to the actual cost of construction." The Secretary adds "this made it appear that ships built in navy yards cost much more than in private yards, and the facts were not always in accord with that appearance. In fact, taken as a whole, the contrary is true if no items are charged up to new construction except such as are increased in a navy yard by reason of such construction."

This statement raises sharply the question whether the Navy Department is actually complying with the law which authorizes the construction of war vessels in navy yards only in the event that they can be built as cheaply as in private shipyards, for it is a well known fact that some of the members of the Naval Committees of the two houses who have voted for recent naval appropriations have assumed that in making its estimate the department would charge against each vessel a large part, if not all, of the overhead charges that would be reckoned by a private establishment excepting, of course, the purely departmental supervision that would correspond to that of the higher organization of the private corporation. In this connection it is learned that the department does not include in its calculations the salaries of the large staff of naval officers in charge of the work of construction in addition to the regular organization of the yards. No account is taken of capital invested in the plant, nor of special machinery employed in vessel construction. No charge is made for depreciation, except in the matter of small tools, etc., which are actually used up during construction. Under the circumstances it is not difficult to see why the department has been able to underbid private shipyards and the only wonder is that any warships have been authorized to be constructed by contract. In this connection Secretary Daniels says:

> It is necessary in order to keep down the prices charged by private contractors, for the government to be able to build its own ships. It then knows the cost and can do all its shipbuilding unless private yards make reasonable prices. During the past year the department authorized new construction work at navy yards which hitherto have not been so engaged. There is, therefore, at the present time a greater volume of new shipbuilding work in progress and authorized at navy yards, also a greater number of navy yards so employed in new construction, than ever before in the history of the new Navy. It includes the battleships Arizona and California at the New York Navy Yard, the fuel ships Kanawha and Maumee at the Mare Island Navy Yard, submarine L-8 at the Portsmouth (N. H.) Navy Yard, transport No. 1 at the Philadelphia Navy Yard, and supply ship No. 1 at the Boston Navy Yard. There have also been constructed at navy yards during the past year numerous coal barges and several self-propelled oil barges.
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> Because of the many advantages, it is the policy of the department to develop shipbuilding at navy yards. Among said advantages are: 1. A check upon the cost of private shipbuilding. 2. Increased efficiency and preparedness of the yard working forces due to a more uniform and steady employment of workmen. 3. An improved morale of yard service, from master workmen to the unskilled laborer. 4. Elimination of the expenses of inspections and trial trips.

It is evident that the department has no reliable basis for some of its estimates as to cost of construction in navy yards, for Secretary Daniels admits that he recently assigned to the Portsmouth, N. H., Navy Yard the construction of submarine L-8 under a license from the Lake Torpedo Boat Company "to arrive at a definite knowledge of the actual construction costs of vessels of this character, and thus put the department in a position to build its own submarine vessels in the future should there be any evidence of the absence of competition for submarine contracts." The secretary adds that during the coming year it is very likely that it will be necessary to increase further the construction of submarines in navy yards.

As was to have been expected, Secretary Daniels repeats his recommendation for the authorization of a Government armor plate factory, declaring that large sums would be saved annually, both through the operation of the plant for the manufacture of armor plate and special-treatment steel, and also because of the lower prices that it is assumed the department would secure from private manufacturers if the Government were in position to make its own armor plate, etc.

W. L. C.

National Foreign Trade Convention at St. Louis in January

At the second National Foreign Trade convention to be held at St. Louis, January 21 and 22, 1915, the National Foreign Trade Council plans to have discussions which will come down to the needs of the various sections and of manufacturers in specific lines. There will be sectional meetings, therefore; and speeches on the general aspects of foreign trade, numerous at other conventions, will be few. Secretary Redfield will open the convention and John Bassett Moore, formerly counselor of the State Department, will speak on "Problems Arising in War and Commerce." Ways and means whereby the smaller manufacturer and merchant may engage in foreign trade will have an important place on the programme. Three thousand commercial and industrial organizations, corporations and firms have been invited to send delegates. In the letter of invitation James A. Farrell, chairman of the National Foreign Trade Council, says:

"The European war has demonstrated that our foreign trade, while small in comparison with domestic business, is a vital element in our domestic prosperity and therefore of immediate concern to every citizen. Individual action, however strong, cannot do justice to the present opportunities for its expansion. Coordinated effort of the entire nation—manufacturers, merchants, bankers, carriers and all others—working in harmony with a well defined national policy, will alone enable us to develop the possibilities now before us."

Furnace Shut-Down Over Coke Freights

The coming of the Lehigh & New England Railroad into the iron freight situation in the Lehigh Valley has caused some commotion over the division of rates. This road, after building a connection to Catasauqua and acquiring the stock of the Crane Railroad from the Empire Steel & Iron Company, absorbed the Crane tracks into its line and thereupon issued a tariff calling for joint rates with the important lines traversing the district. The Central Railroad of New Jersey and the Lehigh Valley joined with the Lehigh & New England in through rates on ore from Buffalo and ore from New Jersey, as well as in rates on pig iron to tidewater and intermediate points. There has been a disagreement, however, over the coke rate, and owing to this the fuel supply of the one Crane furnace that has been operated lately was cut off. The furnace has therefore been shut down. While it is expected that an adjustment of rates will be made in time, it is uncertain when the furnace will be able to resume.

The Weber Chimney Company has changed the location of its New York office from 95 Liberty street to 30 Church street. The company is represented in Eastern territory by Halbert P. Hill, Inc., 30 Church street.

The Machinery Markets

The decision granting to the Eastern railroads a 5 per cent. increase in freight rates, a continuance of export business and a better sentiment on every side are the factors on which the machinery trade bases a belief that better times will be inaugurated in January. The New York market has been encouraged by a slight betterment in domestic demand, while through certain channels in this city extremely large orders for export have been placed. New England is building hope on the large amount of equipment which the railroads of that section are believed to need. Detroit is getting its share of export business and foundries are better engaged, though domestic machinery sales are light. In Cleveland stocks of engine and turret lathes are low, plants making them are working at full capacity, and the domestic demand for some tools shows improvement. Several export orders for lathes are still pending in Cincinnati, and of some other machines there promises to be a scarcity, though some tools are in light demand. Milwaukee is looking forward to January and notes that conditions are better outside of the city than in it. Metal-working plants in the Central South have not yet gone on full time, but more numerous inquiries make the outlook brighter. The demand for machine tools shows an improvement in the Birmingham territory, and in Texas, also, more interest is shown. In St. Louis inquiry has increased and conditions are becoming more normal. Present tendencies are all favorable for good business in the early part of 1915 in the San Francisco district. In the Pacific Northwest many plants are closing for repairs, but inquiries indicate fairly heavy buying of machinery next month.

New York

NEW YORK, December 23, 1914.

Now that the Eastern railroads have been allowed the long-sought increase in freight rates the machinery trade is looking for a decided betterment in railroad buying of shop equipment after the first of January. All agree that many of the roads will take steps to acquire needed equipment sooner than they would have done had the decision been longer delayed or adverse, but there is much difference of opinion as to the extent of the expected buying and how soon it will start. Some believe that the roads will proceed cautiously and others that buying which has been held up will be done expeditiously. Again, there is talk of orders which were placed contingent on a favorable decision being handed down. The probabilities are that the roads will make haste slowly and that revision will be asked on bids which were submitted some time ago and on which action was suspended.

The best feature of the present situation for the trade at large is that domestic business is improving slowly, but surely. Meanwhile the foreign buying is as heavy as ever, though it continues true that this activity is not distributed throughout the trade. The demand is largely for automatic screw machines, turret lathes and engine lathes. Last week a New York company placed orders for over 50 automatics and over 80 turret lathes, all in Cleveland, Ohio, and over 30 engine lathes in New England. These machines are all for export to the allied countries. A New York company has taken bids on 12 large engine lathes for Schneider & Co., Creusot, France. Canadian companies who are making shrapnel have been good purchasers of turret and automatic lathes.

Action by Russia, both in the purchase of machine tools and orders for shrapnel, is proceeding slowly, awaiting definite instructions from abroad. Persons in touch with foreign interests say that Russia will place shrapnel orders, when the time comes, only with firms of unquestioned standing, who possess ample equipment, and that the output will be scrutinized closely by competent experts.

A receiver for the International Typesetting Machine Company, New York, was appointed in the Federal District Court at New York, December 16. Two banking institutions with claims of $61,456.26 and the company itself joined in the prayer for the appointment of the receiver. Erskine Hewlitt was named. The company, which is a $4,000,000 corporation, headed by Herman Ridder, New York, and makes a machine known as the Intertype, has a plant in Brooklyn. The war and financial conditions are given as the causes of the troubles of the company which, President Ridder has said, are but temporary for the reason that the company is backed by men with large resources. Mr. Ridder states that 20 per cent of the company's product was exported, but this trade has ceased. The European market was a cash market, but American purchasers, on account of financial conditions, have demanded extended time payments, and this depleted the working capital of the company.

The Victor Talking Machine Company, according to Louis F. Geissler, its general manager, is about to let contracts for another $1,000,000 extension to its plant in Camden, N. J. To increase its capacity, one of the new contracts provides for a power house and additional machinery which will add 2000 hp., at an estimated cost of about $150,000. The other new extension, plans for which were completed this week, is for a $500,000 office building. It will be eight stories high and face the city park, at Cooper street from Front street. All of the extensions will be of fireproof concrete construction. Other buildings which are nearing completion are a new grinding plant that will cost nearly $400,000 and will be used to grind record material, and a shipping department building, five of the six stories of which are completed, the contract cost being $750,000.

The Premier Sales Company, 320 Broadway, New York, has been incorporated to manufacture vending machines and other mechanical devices. It has acquired a shop, fully equipped. Nathan Newman is president and Jerome Horowitz is manager.

The business of George M. Eddy & Co., 351 Classon avenue, Brooklyn, N. Y., manufacturer of measuring devices, surveying instruments, etc., has been incorporated with a capital stock of $50,000 by J. G., G. E. and J. Lynn Eddy.

The Van Daam Fuel Saving Company, Buffalo, has been incorporated with a capital stock of $100,000 and will manufacture devices for smoke suppression and the saving of fuel. J. R. Irons, Kenmore, N. Y.; J. E. Klein and C. E. Naples, Buffalo, are the incorporators.

The Resilient Steel Wheel Company, Syracuse, N. Y., has been incorporated with a capital stock of $25,000 by J. M. Grenon, C. and H. F. Leonard, to manufacture automobiles, motor trucks and sundries for the automobile trade.

The 3-story mill of the Pennsylvania Feldspar Company, Franklin Bank Building, Philadelphia, on the Genesee River, north of Rochester, N. Y., which was destroyed by fire December 13, with a loss of $125,000 on building and machinery, will be rebuilt.

The Smith Furnace Company, Buffalo, has been incorporated with a capital stock of $100,000 to manufacture engines, boilers, general machine shop, foundry and factory supplies and devices for extracting arsenic from minerals. William R. Smith, 1411 Main street; W. J. Wright and J. M. Briggs are the incorporators.

The plant of the United States Rubber Reclaiming Company, Babcock street and the Erie Railroad, Buffalo, was damaged by fire December 13 to the extent of $75,000.

The Braman Mfg. Company, West Carthage, N. Y., has been incorporated by O. H. and M. E. Braman and F. P. Phillips to manufacture woodenware, rollers, handles and other wooden products.

Plans are being prepared for eight gate houses and a storehouse to be erected by the Government at the U. S. ship canal lock, Black Rock Harbor, Buffalo, at an estimated cost of $50,000. Esenwein & Johnson, Ellicott Square Building, Buffalo, are the architects.

Work has been commenced on the addition to be made to the plant of the Alberger Pump & Condenser Company, Newburgh, N. Y., by James F. Templeton & Son, contractors.

James B. Thompson & Co., Pleasant Valley, N. Y., are making extensive repairs to the former Garner mill and will equip it for the manufacture of twine and thread.

The Crescent Calk Corporation, Syracuse, N. Y., has been incorporated with a capital stock of $100,000 to manufacture horseshoes, etc. H. Hendrickson, J. D. Sweet and J. V. Hemstreet, Herkimer, N. Y., are the incorporators.

The Rifton Carpet Company, Rifton, N. Y., will alter its plant which has been shut down, and will resume operations in the spring.

The Asbestos Wood Mfg. Corporation, Poughkeepsie, N. Y., has been incorporated with a capital stock of $250,000 to manufacture fireproof and weatherproof materials, artificial wood, etc., by H. H. Vail, R. F. Butts and C. J. Connally. It has purchased the assets of the American Mineral Wood Mfg. Company, including factory buildings, machinery, patents, etc. H. H. Vail is president and manager, and R. F. Butts, secretary.

A small pumping plant for high pressure service is to be installed at the city waterworks, Binghamton, N. Y. M. Stoppard is superintendent.

The Schaller System Coal Saver Corporation, Esopus, N. Y., has been incorporated with a capital stock of $350,000 by W. L. Ferley, New York City, J. J. Miller and H. Wagner, Brooklyn, to manufacture fuel saving apparatus, etc.

The Hydraulic Turbine Corporation, Camden, N. Y., has been incorporated with a capital stock of $1,000,000 to manufacture turbines. Isaac D. West, R. E. Horton and W. D. Lewis are the incorporators.

Almiral & Co., 1 Dominick street, New York City, has been incorporated with a capital stock of $200,000 to manufacture heating, ventilating and fire extinguishing systems. J. A. Almiral, W. J. Wood and W. C. Adams are the incorporators. It succeeds the firm of Evans, Almiral & Co., heating and ventilating engineers, etc.

New England

BOSTON, MASS., December 22, 1914.

In common with many other lines of industry the machinery trade is well satisfied with the freight rate decision. Probably the New England railroads will not profit greatly by the additional 5 per cent., but they have advanced their passenger rates quite materially in recent months, and the combined growth of income will enable them to take care of any urgent requirements. As a matter of fact, the local railroads are pretty well equipped with repair shops. The New York, New Haven & Hartford has the great plant at Readville, Mass., and the Boston & Maine the fine new shops at Billerica, Mass., which are ample to take care of the rolling stock of a large part of that system.

The machine-tool builders' outlook is a much broader one. Taking the country as a whole, the railroads need very large improvements to their shops, many of which are far behind the times in equipment. The total of requisitions for machinery that have been passed upon favorably and are still pending is believed to be very large. Gradually these requirements will be taken care of out of the promised additional earnings, according to the general opinion.

The understanding among New England manufacturers is that some of the big shrapnel contracts have been placed, which will mean machinery purchases and sub-contracts for forgings.

The Billings & Spencer Company, Hartford, Conn., manufacturer of drop forgings, drop forging machinery and small tools, has awarded the contract for extensive alterations to the works of the Columbia Motor Vehicle Company, purchased some time ago to provide space for the increasing business. The foundry building will require a steel truss roof covered with corrugated iron, and another building will be reinforced with structural steel, to provide for the installation of traveling cranes. A new boiler plant will also be required.

The Connecticut Agricultural College, Storrs, Conn., is about to place the contract for its machinery school building.

McLane Brothers, Whitman, Mass., will build a two-story addition, 40 x 40 ft.

Wade Brothers, Brockton, Mass., will replace their factory, destroyed by fire last summer, with a thoroughly modern plant of mill construction. The main building will be 75 x 100 ft., with 25-ft. wing, all four stories and basement. Altogether 50,000 sq. ft. of floor space will be provided.

The MacArthur Concrete Pile & Foundation Company, 11 Pine street, New York City, has been awarded the contract for the foundation of a boiler house to be erected at the plant of the Portland Gas Light Company, Portland, Maine.

The carbonizing plant of the American Woolen Company, Burlington, Vt., was burned, December 11, with a loss of $80,000.

The foundry of the Howe Scale Works, Rutland, Vt., was destroyed by fire, December 10, with estimated loss of $40,000.

The John Davenport Foundry Company, Stamford, Conn., is creating branch works in Montreal, where manufacturing for the Canadian trade will be carried on. The company specialized in Stamford on piano plate specialties. Large orders for materials of another class have been received from Canadian customers—the nature of the business is withheld.

The Bridgeport Pattern & Model Company, Bridgeport, Conn., has awarded the contract for its new factory, already mentioned. The building will be 42 x 72 ft., with ell 24 x 50 ft., all three stories and of mill construction.

Chicago

CHICAGO, ILL., December 21, 1914.

While there is beginning to be a sprinkling of inquiry for tools which prospective purchasers expect to be able to buy early in 1915, the remaining days of December promise only very light business. Machinery interests are expressing the hope that the granting of the freight rate increase will be the forerunner of the much needed rehabilitation of mechanical equipment by the railroads. Of this there has been some tentative promise. A large offering of second-hand machinery has been made, due probably to the desire to turn inventory into cash before the year's end.

The Electric Ticket Machine Company, Chicago, has been incorporated with a capital stock of $100,000 by E. W. Mosher, E. H. Tillson, 189 West Madison street, and F. R. Wescott to manufacture and deal in machinery, appliances, etc.

The Fullitte Dimmer Company, Chicago, has been incorporated with a capital stock of $10,000 to manufacture and sell automobile appliances, parts, etc. The incorporators are T. C. Phillips, G. S. Inman and R. E. Schreiber, 10 South LaSalle street.

The Universal Concrete Bar Company, Chicago, has been incorporated with a capital stock of $2400 by Carl R. Chindbloom, 167 West Washington street, O. W. Brecher and Lambert Kaspers. It will manufacture and deal in protection bars and other construction appliances of metal, wood, concrete, etc.

The Clearing Water Company, Chicago, has been incorporated with a capital stock of $40,000 by H. A. Maher, P. T. Cannon and O. P. Stewart, to acquire and operate waterworks and pumping stations.

The Korff Mfg. Company, Chicago, has been incorporated with a capital stock of $50,000 to manufacture and deal in machinery. The incorporators are T. F. Hyland, F. H. Korff and Joseph Muhlke, 35 North Dearborn street.

The Berlin Motor Company, Chicago, has been incorporated with a capital stock of $2500, to manufacture and deal in machinery, tools, auto parts, attachments, etc. Thomas W. Prindeville, 30 North LaSalle street, J. D. Daly and A. J. Schmidt are the incorporators.

The Western Stove Company building at Peoria, Ill., occupied by the Peoria Trusswall Stone Mfg. Company and the Haag Brothers Company, manufacturers of power washing machines, was destroyed by fire. The former company lost about $8000 in machinery, patterns and stock, and the latter about $3000 in machinery and stock.

The Pioneer Mfg. Company, Waterloo, Iowa, has been incorporated by J. L. Zeidler, St. Joseph, Mo., J. M. Shenk, and H. A. Sharp, Waterloo, and others, with a capital stock of $125,000. J. L. Zeidler is president and J. M. Shenk, vice-president.

Detroit

DETROIT, MICH., December 21, 1914.

Conditions in the local machinery market remain practically unchanged. General business conditions seem to warrant a better outlook. Detroit is getting its share of foreign business and inquiries from abroad are being plentifully received. Sales of tools, both new and second hand, have been light and confined to single tools. Foundries are somewhat better engaged. Conditions in building circles continue to be very dull, with no immediate prospect of improvement.

The Leather Makers Process Company, Detroit, has been incorporated with $20,000 capital stock to manufacture glue and tanners' supplies. Carl E. Schmidt, A. B. Moran and W. E. Oxtoby are the incorporators.

The plant of the Detroit Oval Company, Detroit, was destroyed by fire December 16, entailing a loss of about $30,000. Operations will be continued. William M. Levyn is secretary and treasurer.

The Auto Spray Company, Detroit, has been incorporated with $10,000 capital stock to manufacture automobile accessories. The incorporators are R. H. Evans, H. J. Skivington and D. H. Bentley.

The Magee Sheet Metal Machinery Company, Detroit, has been incorporated to manufacture sheet metal work and tools for the manufacture thereof. Wilbur R. Magee and Frank W. Atkinson are the principal stockholders.

The Huron Implement Company, Bad Axe, Mich., has been incorporated with $20,000 capital stock by Thomas McEwing, S. H. Pangborn and Joseph N. Rankin. It will manufacture agricultural tools and implements upon the completion of its factory.

Milwaukee

MILWAUKEE, WIS., December 21, 1914.

This week and next form a period of restricted operations; but a few shops are maintaining their schedules to avoid delay in production, as orders are too few and far between to make a holiday vacation preferable. New business is lacking; but a feeling is general that a turn for the better will occur in January. General industrial conditions in the interior of the state are much better than in Milwaukee. This has been true throughout the entire year.

A plant for the manufacture of dry-cleaning and dyeing machinery will be opened at Baldwin, Wis., by A. B. Miller, who is organizing the Baldwin Cleaning Machinery Company, with $10,000 capital stock.

Philip and W. J. Koehring, of the Koehring Machine Company, Milwaukee, concrete mixers, etc., with William Dennis, Milwaukee, have incorporated the Dennis Traction Grader Company with a capital stock of $10,000 to manufacture road building machinery.

The Milwaukee Post Mold Company has been incorporated with a capital stock of $5000 by G. N. Kenyon, A. A. Rehfeld and C. H. Juergens, attorney, to manufacture metal forms for casting concrete posts and similar material.

The Western Steel & Iron Works Company, De Pere, Wis., is contemplating the erection of an addition duplicating its present shop. Incidentally the concern is considering a plan of removing to Green Bay, Wis., six miles from De Pere.

In anticipation of a revival of the gasoline engine and farm machinery trade, the Fairbanks-Morse Mfg. Company, Beloit, Wis., is overhauling its gas engine department. As soon as 56,000 sq. ft. of new concrete floor is laid, machinery will be rearranged for efficiency and some new equipment added.

Otto E. Scherer, Palmyra, Wis., plans remodeling two implement warehouses into garages, one to be equipped with machinery for general repair work on automobiles and machinery. The cost of the work is estimated at $20,000.

John Allen, Equitable Electric Light Company, Lake Geneva, Wis., is taking sealed bids until January 5 for furnishing a 150-hp. steam engine, etc.

The Cohen Machinery & Iron Company, 242 Madison street, Milwaukee, is contemplating the erection of a warehouse, 50 x 100 ft.

Walter and Otto H. Stelling, Port Washington, Wis., are establishing a factory under the name of the Stelling Mfg. Company to manufacture pocket flash lights and other small electrical devices. The castings will be made under contract with the Gilson Mfg. Company.

The state board of control of Wisconsin, of which M. J. Tappins is secretary, will take sealed bids until January 4 for the erection of the first unit of the new state reformatory for women at Taycheedah. The unit will cost $220,000 and includes the power, light and heating plant, and the water system.

S. E. Conley, Sharon, Wis., will build a 60 x 66 ft. addition to his garage and install a small machine shop.

The Minneapolis, St. Paul & Sault Ste. Marie Railway Company, 317 Second avenue, Minneapolis, announces that it will spend from $25,000 to $35,000 in repairing and rebuilding its ore dock at Ashland, Wis.

The Utility Steel Tractor Company, Milwaukee, has been incorporated with a capital stock of $10,000 by D. S. Stewart, N. C. Nordin and F. A. Hecker.

Patrick Bradley, Wausau, Wis., and Charles Jones, Mosinee, Wis., have formed the Jones-Bradley Company to establish a potash factory at Menominee, Mich. The main building will be 30 x 100 ft., and the power plant 20 x 20 ft.

The E. Wege Concrete Machinery Company, 118 South Second street, LaCrosse, Wis., will not build an additional factory, as has been reported.

According to present plans, the Silent Washer Mfg. Company, Appleton, Wis., will build within the next year a new plant which will triple its present manufacturing capacity.

The F. J. Greene Engineering Works, Racine, Wis., is building a large addition to its plant.

The Universal Motor Company, Oshkosh, Wis., has been incorporated with a capital stock of $25,000 by John D. Termaat, Louis J. Monahan and A. B. Dye. It was organized to take over the business of the Badger Mfg. Company, manufacturer of automobile engines, etc.

Indianapolis

INDIANAPOLIS, IND., December 21, 1914.

The Lyons-Atlas Company, Indianapolis, manufacturer of boilers, engines, etc., has increased its capital stock from $500,000 to $1,500,000, preparatory to engaging in the manufacture of automobiles.

The Stover-Langley Contractors Equipment Company, Indianapolis, has been incorporated with $5000 capital stock to manufacture machinery. The directors are B. H. Stover, Silas E. Longley and Mentor Wetzstein.

The Savidge Steering Device Company, Indianapolis, has been incorporated with $6000 capital stock, by A. C. Savidge, B. F. Meixell and H. F. Campbell, to manufacture automobile parts.

The Non-Sewer Sanitary Closet Company, Indianapolis, has been incorporated with $5000 capital stock, to manufacture sanitary closets. A. R. Clark, Elmer Dixon and H. T. Harris are the incorporators.

The Adjustable Auto-Shoe Company, Indianapolis, has been incorporated with $10,000 capital stock, to manufacture automobile accessories. W. A. Parr, L. O. Gillaspy and G. E. Parr are the directors.

The William R. Griffey Specialty Company, Indianapolis, has been incorporated with $5000 capital stock, by W. R., John B. and Bernard E. Griffey, to manufacture automobile parts and accessories.

The Eclipse Mfg. Company has been incorporated in this city, with $50,000 capital stock, to manufacture spark plugs and motor accessories.

The Parcel Post Scale Company, South Bend, Ind., has been incorporated with $10,000 capital stock, to manufacture scales. The directors are C. L. Kimball, E. B. Priddy and D. W. Kimball.

The Wabash Specialty Company, Wabash, Ind., has changed its name to the Wabash Sani-Tray Company.

The first unit of the new plant of the Edwards Mfg. Company, Chicago, manufacturer of high pressure steam fittings, at East Chicago, Ind., will cost $50,000.

The Union Heater & Supply Company, Ft. Wayne, Ind., has been incorporated with $25,000 capital stock, to manufacture plumbers' supplies. The directors are M. and E. Goldberger and M. Roth.

Cleveland

CLEVELAND, OHIO, December 22, 1914.

The domestic demand for turret lathes has improved materially and foreign orders for small lots of machines continue good. Local builders have very few lathes left in stock and on some types of turret machines deliveries have been extended as far as April. Makers are now running their plants at practically full capacity. The foreign demand for automatics is still good. Dealers are doing a fair volume of business in single tools but no new inquiry for lots of any size is coming out. The inquiry from the Central Steel Company, Massillon, Ohio, for several tools for machine shop equipment, noted about 60 days ago, is still pending. This business will probably be placed early next year. The rate decision in favor of the railroads is expected to have a stimulating effect upon the machinery market and dealers are looking for an improvement after the holidays and inventory taking time. Engineering firms report an improvement in inquiry for new work. In some cases it is stated that the carrying out of projects depended upon a favorable decision in the rate case.

The Excel Safety Gas Valve Company, Cleveland, has been incorporated with a capital stock of $15,000 by M. E. Bell, R. R. Snow, H. O. Yoder, and others.

The Braddon Gas Appliance Company, Lorain, Ohio, has been incorporated with a capital stock of $15,000 by J. H. Braddon, W. A. Seher, L. A. Fauver, W. H. Hill and Morris Eynon. It expects to establish a plant to manufacture a device that automatically turns off the burners on a gas stove.

The Ohio Brass Company, Mansfield, Ohio, has received a large order for the high tension insulators and other equipment that will be needed in connection with the electrification of one of the divisions of the Chicago, Milwaukee & St. Paul Railroad.

The McGraw Tire & Rubber Company, East Palestine, Ohio, has awarded a contract for the erection of a plant addition.

The Toledo Rotary Gas Engine Company, Toledo, Ohio, has been incorporated with a capital stock of $50,000 by John Daiber, Jr.; R. J. Griffith, A. C. Kelting, and others.

What THE IRON AGE was in 1914

is the best promise of

What THE IRON AGE will be in 1915

In nineteen hundred and fourteen this paper reached high mark on all these gauges:

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Number, variety and quality of articles
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More matter of value on the War and Export Situation in the Iron and Steel and Machinery trades in the 13 issues of August, September and October than in any other journal reaching those industries.

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130 articles on Works Management, Cost Finding, Manufacturing Methods, Wage Systems and Productive Efficiency—the equal of a volume of 500 6 x 9-in. pages.

The best literature of the year on Steel-making progress in the United States and Europe—the most important papers and foreign articles in full.

The truth about the iron and steel trades, without favor or bias, in weekly market reviews.

The news of Foundry and Machinery trade developments while it is news. Nowhere else were the facts about the war demand given so promptly or so fully.

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Ahead looms up a year full of critical interest to every buyer of iron and steel.

Manufacturers never searched so closely as they are searching today to find the business trend for coming months.

"The Iron Age's" market news and market interpretation—quoted every week all over the United States and Europe—were never so valuable as they will be in this pivotal year 1915.

"The Iron Age" is the
world's most widely
quoted trade paper

The newly organized Toledo-Ford Tire Company, Findlay, Ohio, has elected R. F. Teall, president; C. F. Taggart, Toledo, secretary, and I. V. Maclean, manager. It is expected that the work of equipping the plant for the manufacture of automobile tires will be started after the holidays.

The W. H. Mullins Company, Salem, Ohio, has recently received some good orders for automobile car bodies and is now running its plant at a largely increased capacity, some of the departments working on full time.

Sealed proposals will be received by the trustees of public affairs, Plain City, Ohio, December 28, for three motor-driven centrifugal pumps, one of 450, one of 150, and the third of 100-gal. per minute capacity.

An additional 350-hp. gas engine and generator will probably be purchased shortly for the municipal electric light and power plant, Canal Dover, Ohio.

Cincinnati

CINCINNATI, OHIO, December 21, 1914.

It is yet too early to predict what effect the rate increase allowed will have on railroad buying. Quite a number of manufacturers believe that the next 30 days will bring out some very encouraging developments in almost all lines of business. It is an open secret that nearly all of the railroads are not only badly in need of rolling stock, but that their repair shops are woefully lacking in equipment. Should the situation develop as quickly as is anticipated in some quarters the delivery of medium sized lathes and vertical milling machines will be very slow. Foreign demand has almost cleaned out stocks on hand, and a number of inquiries are still being figured on. It is probable that many inquiries are duplicates, and that the reported volume of European business to be had is much larger than actual requirements. However, several orders for lathes have yet to be placed, including one from a Russian source, mention of which was made last week. A very light demand is noted for shapers; and some orders for planers and boring mills have been received lately.

The jobbing foundries continue quite busy, and recently it was found necessary to send some work to outside foundries in order to get the quick delivery wanted. Second-hand machinery is very quiet.

The Electric Horsepowers Company, 906 Elm street, Cincinnati, is fitting up a shop for the manufacture of a farm lighting outfit. It will probably require an 18-in. lathe.

Val Duettenhorfer, Cincinnati, is having plans made up for an eight-story building to be constructed at Sixth and Sycamore streets. Part of the building will be fitted up for small manufacturing concerns.

The American Diamalt Company, 308 West Fourth street, Cincinnati, will make additions to its plant at Riverside.

The Cincinnati Fireproof Door Company, Cincinnati, has increased its capital stock from $15,000 to $30,000. No immediate additions to its plant are planned.

John Dewine, Yellow Springs, Ohio, is having plans prepared for a grain elevator and other additions to his feed plant in Columbus, estimated to cost $50,000.

J. W. Tulga, Ironton, Ohio, carriage and wagon builder, has tentative plans for a three-story factory that will more than double the capacity of his plant.

The B. H. Winters Company, Springfield, Ohio, lithographer and manufacturer of metal signs and novelties, has increased its capital stock from $60,000 to $150,000, and will enlarge its plant at an early date.

The plant of the Troy Foundry Company, Troy, Ohio, was partially destroyed by fire last week. The loss is estimated at $3000. Repairs will be made as soon as permission from the receiver of the company can be obtained.

The Regie Brass Company, Marysville, Ohio, has increased its capital stock from $75,000 to $110,000. Nothing is known as to its plans for enlarging its business.

Birmingham

BIRMINGHAM, ALA., December 21, 1914.

A distinctly better tone is evident in the machine tool market and transactions have picked up to a small extent, but the volume is still restricted. Business interests dependent upon cotton are more optimistic. The demand for machine tools is better than for some time.

The Ornamental Foundry Company, Anniston, Ala., has been incorporated with a capital stock of $50,000 by G. and E. R. Schumacker and G. H. Young, to do a general foundry business, specializing on ornamental iron columns.

The Birmingham Ice Company, Birmingham, has begun excavations for a 60-ton ice factory, etc.

O. N. Richardson, president of the Rome Soil Pipe Mfg. Company, Rome, Ga., and associates, will organize a lumber company with a capital stock of $10,000.

The Guest Rotary Engine Company, Tuscaloosa, Ala., has been incorporated by W. T. Guest, M. G. Rennley, P. E. Green, and others.

G. W. Craddick, Barnesville, Ga., and associates, have incorporated with a capital stock of $4000 and will build a factory for the manufacture of harness.

The Modern Mill Company, Macon, Ga., has awarded contracts for the erection of a flouring mill with a capacity of 1000 bu. of wheat a day. J. S. Birdsey and R. T. Birdsey are among the principals.

Quitman, Ga., has sold $75,000 of bonds and will soon let the contract for the construction of an electric lighting plant.

The Krebs-Pigman Paint Company, Newport, Del., proposes to mine ore near Cartersville, Ga., for use in the manufacture of paints. Mining machinery and pumps will be installed.

The Macon County Brick Company, Oglethorpe, Ga., has been incorporated with a capital stock of $100,000 by J. H. Oxford, J. M. Cobb, J. T. Lee and T. H. Rains.

The Jacksonville Steel Castings Company, Jacksonville, Fla., will erect a plant with a capacity of 10 tons of refined steel a day. H. H. Buckman, Jr., Indianapolis, Ind., is president.

The Wulbern Fertilizer Company, 189 East Bay street, Charleston, S. C., has been incorporated with a capital stock of $200,000 to crush limestone for fertilizer. It will erect a plant to cost $30,000. S. O. Izlar is president.

The Central South

LOUISVILLE, KY., December 21, 1914.

Reports of improved prospects form the best indication of conditions. Machinery manufacturers state that, while the volume of business being handled is not greatly increased, inquiries are more numerous, and the outlook for business is better. Metal-working plants which have been operating short time or have been closed down, are now running on a better schedule. Full-time operations, however, are the exception. Farm implement factories have been hard hit because of depressed conditions in the South, but are now finding conditions more favorable. The demand for boilers is poor, and power equipment generally is slow; but some lines of special machinery are picking up.

The Universal Swing Joint Company, Ninth and Jefferson streets, Louisville, will be in the market for additional metal-working equipment.

The Citra-Cola Mfg. & Bottling Company, Louisville, has been incorporated with $250,000 capital stock and will erect a plant. D. R. Lindsay, W. D. Eckert and Allen R. Carter are the incorporators.

The first mortgage bondholders of the Bradford Worsted Spinning Company, a leading textile plant of Louisville, purchased the plant at a sale to satisfy a judgment. It will be kept in operation.

Plans for the enlargement of the plant of the Ewald Iron Company, Louisville, which operates a rolling mill, are being considered. The control of the company has been purchased by R. Baylor Hickman, president, and associates.

Work on the plant of the Columbia Sanitary Mfg. Company, Louisville, reference to which was made in *The Iron Age* recently, has been begun.

The W. T. Pyne Mill & Supply Company, Louisville, has purchased the old plant of the Peter-Melcher Stone Company and will use it for structural iron and sheet metal operations. It will move all of its equipment to this plant. It is stated that no new machinery will be required. One additional building of steel construction will be erected. Fred W. Hardwick is president.

W. R. & C. P. Pence, Philadelphia, Pa., who have leased coal land near Typo, Ky., have announced that an electrically equipped plant will be installed with a daily output of 100 tons.

Bucket conveyor equipment will be needed by the Hazard Town Coal Company, Hazard, Ky.

Fred Hunt, Somerset, Ky., is reported to be planning the purchase of portable equipment for boring cylinders and facing valve seats.

The Lancaster, Ky., electric light plant will probably be changed from direct to alternating current, and two 125-kw. generators and an engine will be purchased. G. C. Rose is in charge.

The Greencastle Gas Company, Greencastle, Ind., is building a powerhouse, preparatory to the installation of an additional boiler.

The Railways Ice Company, Chicago, Ill., has let a contract for the construction of an ice factory at Nonconnah, Tenn. Most of the equipment has been purchased. The plant will have a capacity of 150 tons a day.

The Knoxville Lumber & Mfg. Company, Knoxville, Tenn., is in the market for wood-working equipment, including planer, matcher, railway cut-off saw, double-end tenoning machine, power-feed rip-saw, etc.

Webb & Maury, Memphis, Tenn., will establish a grain elevator.

The woodworking plant of the Hise Mfg. Company, manufacturer of carriage and wagon material, Johnson City, Tenn., which was burned last week with a loss of $35,000, will be rebuilt. J. W. Hise is president.

The Auto Body Works, Nashville, Tenn., has established a plant at Seventeenth avenue, North, and the N. C. & St. L. Railway. W. F. Anderson is president; R. M. Herges, Jr., vice-president, and T. J. Potter, manager.

The Empire Machinery & Supply Corporation, 36 Commercial Place, Norfolk, Va., has been incorporated with a capital stock of $100,000 to do a general machinery and supply business. It has purchased the stock of the S. M. Price Machinery Company, bankrupt. J. Ross MacNeal is president and treasurer.

St. Louis

ST. LOUIS, MO., December 21, 1914.

Tentative inquiry for machine tools has been recently increased and indications are that operations will be increased and new plants started up after the first of the year in such number as to lead to a reasonably satisfactory increase in business. The decision on freight rates came too late in the week to develop any feeling other than that of an enhanced confidence in the near future. Money rates are decreasing and new enterprises are expected to find an improvement in the possibilities of financing. Collections are reported steadily better.

The Polyplane Motor & Metal Mfg. Company, St. Louis, has been incorporated with a capital stock of $100,000 by G. A. Krause, W. P. Morgan, Jesse M. Neff, Charles Klein and F. P. Smith, to manufacture aeroplanes and metal products; also an alloy asserted to be lighter and stronger than aluminum.

The Hennes-Reichert Iron Works, St. Louis, has been incorporated with a capital stock of $12,000 by A. R. Hennes, C. J. Reichert and F. G. Schreck to do a general steel and iron manufacturing business.

The Heimbuecher Metal Products Company, St. Louis, has been incorporated with a capital stock of $15,000 by W. C. and J. H. Heimbuecher, and Adele Neupert to do a general metal manufacturing business.

The Summers Motor Devices Company, Kansas City, Mo., has been incorporated with a capital stock of $15,000 by C. E. Summers, W. E. Robbins and Charles E. Adams.

The Erickson Auto Service Company, Kansas City, Mo., has been incorporated with a capital stock of $15,000 by Carl Erickson, Robert T. Romine and A. D. Newton, and will equip a machine shop and garage.

The electric light commission, Clarence, Mo., of which Don McIntire is superintendent, will install one 200-hp. generating unit, Corliss engine direct-connected to alternator and belted exciter.

The Tombigbee River Lumber Company, Lloyd Building, Kansas City, Mo., is receiving bids for furnishing portable mills. L. E. Wyne is president.

The Murphy Construction Company, East St. Louis, Ill., has been awarded the contract for the construction and equipment of the new $250,000 roundhouse and shops of the Southern Railway at East St. Louis. It will be an 18-stall house with two large machine shops, mechanical coaling station and other special equipment.

The General Chemical Company, manufacturer of sulphate of alumina, East St. Louis, is doubling the capacity of its plant at a cost of $300,000.

Gurdon, Ark., will equip an electric light plant, a waterworks and a sewer plant. The mayor is in charge.

The Bentonville Ice & Cold Storage Company, Bentonville, Ark., will rebuild its burned plant.

The Cunningham Commission Company, Little Rock, Ark., will build a grain elevator to cost $20,000 to replace one recently burned.

Malvern, Ark., will install a sewer system with a disposal plant. Waterworks are also to be installed.

The Arkansaw Water Company, Little Rock, Ark., will equip a new station, including cranes for pumps, etc., the new equipment to cost about $40,000.

The business men of Ft. Smith, Ark., plan to build an electric plant after the first of the year to supply their places of business with light and current.

A wood handle factory will be equipped at Blytheville, Ark., by the Kelly National Handle Company, Charleston, W. Va.

The J. R. Shain Lumber Company, Leslie, Ark., will erect a handle factory with equipment to cost about $5000, exclusive of structure.

The mechanical coal chute with equipment costing about $15,000 will be installed at Paragould, Ark., by the St. Louis, Iron Mountain and Southern Railway Company, of which J. R. Stephens, St. Louis, is the engineer in charge.

The Tecumseh Cement Silo Company, Tecumseh, Okla., has been incorporated with a capital stock of $18,000 by W. C. Furry, A. C. Neel and M. D. Lewis.

The Fairland Light & Power Company, Fairland, Okla., will install one 35-hp. and one 45-hp. boiler and other equipment. Floyd Roberts is superintendent.

An electric light plant and an ice plant will be installed at Ringling, Okla., by Burt Foster, Ardmore, Okla.

The Locust Grove Light & Power Company, Locust Grove, Okla., will develop about 40 hp. H. D. Long is the engineer.

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The Saskatchewan Mines Development Company, Ltd., Prince Albert, Sask., has been incorporated with a capital of $150,000.

The Railways Ice Company, Chicago, Ill., has let a contract for the construction of an ice factory at Nonconnah, Tenn. Most of the equipment has been purchased. The plant will have a capacity of 150 tons a day.

The Knoxville Lumber & Mfg. Company, Knoxville, Tenn., is in the market for wood-working equipment, including planer, matcher, railway cut-off saw, double-end tenoning machine, power-feed rip-saw, etc.

Webb & Maury, Memphis, Tenn., will establish a grain elevator.

The woodworking plant of the Hise Mfg. Company, manufacturer of carriage and wagon material, Johnson City, Tenn., which was burned last week with a loss of $35,000, will be rebuilt. J. W. Hise is president.

The Auto Body Works, Nashville, Tenn., has established a plant at Seventeenth avenue, North, and the N. C. & St. L. Railway. W. F. Anderson is president; R. M. Herges, Jr., vice-president, and T. J. Potter, manager.

The Empire Machinery & Supply Corporation, 36 Commercial Place, Norfolk, Va., has been incorporated with a capital stock of $100,000 to do a general machinery and supply business. It has purchased the stock of the S. M. Price Machinery Company, bankrupt. J. Ross MacNeal is president and treasurer.

St. Louis

ST. LOUIS, MO., December 21, 1914.

Tentative inquiry for machine tools has been recently increased and indications are that operations will be increased and new plants started up after the first of the year in such number as to lead to a reasonably satisfactory increase in business. The decision on freight rates came too late in the week to develop any feeling other than that of an enhanced confidence in the near future. Money rates are decreasing and new enterprises are expected to find an improvement in the possibilities of financing. Collections are reported steadily better.

The Polyplane Motor & Metal Mfg. Company, St. Louis, has been incorporated with a capital stock of $100,000 by G. A. Krause, W. P. Morgan, Jesse M. Neff, Charles Klein and F. P. Smith, to manufacture aeroplanes and metal products; also an alloy asserted to be lighter and stronger than aluminum.

The Hennes-Reichert Iron Works, St. Louis, has been incorporated with a capital stock of $12,000 by A. R. Hennes, C. J. Reichert and F. G. Schreck to do a general steel and iron manufacturing business.

The Heimbuecher Metal Products Company, St. Louis, has been incorporated with a capital stock of $15,000 by W. C. and J. H. Heimbuecher, and Adele Neupert to do a general metal manufacturing business.

The Summers Motor Devices Company, Kansas City, Mo., has been incorporated with a capital stock of $15,000 by C. E. Summers, W. E. Robbins and Charles E. Adams.

The Erickson Auto Service Company, Kansas City, Mo., has been incorporated with a capital stock of $15,000 by Carl Erickson, Robert T. Romine and A. D. Newton, and will equip a machine shop and garage.

The electric light commission, Clarence, Mo., of which Don McIntire is superintendent, will install one 200-hp. generating unit, Corliss engine direct-connected to alternator and belted exciter.

The Tombigbee River Lumber Company, Lloyd Building, Kansas City, Mo., is receiving bids for furnishing portable mills. L. E. Wyne is president.

The Murphy Construction Company, East St. Louis, Ill., has been awarded the contract for the construction and equipment of the new $250,000 roundhouse and shops of the Southern Railway at East St. Louis. It will be an 18-stall house with two large machine shops, mechanical coaling station and other special equipment.

The General Chemical Company, manufacturer of sulphate of alumina, East St. Louis, is doubling the capacity of its plant at a cost of $300,000.

Gurdon, Ark., will equip an electric light plant, a waterworks and a sewer plant. The mayor is in charge.

The Bentonville Ice & Cold Storage Company, Bentonville, Ark., will rebuild its burned plant.

The Cunningham Commission Company, Little Rock, Ark., will build a grain elevator to cost $20,000 to replace one recently burned.

Malvern, Ark., will install a sewer system with a disposal plant. Waterworks are also to be installed.

The Arkansaw Water Company, Little Rock, Ark., will equip a new station, including cranes for pumps, etc., the new equipment to cost about $40,000.

The business men of Ft. Smith, Ark., plan to build an electric plant after the first of the year to supply their places of business with light and current.

A wood handle factory will be equipped at Blytheville, Ark., by the Kelly National Handle Company, Charleston, W. Va.

The J. R. Shain Lumber Company, Leslie, Ark., will erect a handle factory with equipment to cost about $5000, exclusive of structure.

The mechanical coal chute with equipment costing about $15,000 will be installed at Paragould, Ark., by the St. Louis, Iron Mountain and Southern Railway Company, of which J. R. Stephens, St. Louis, is the engineer in charge.

The Tecumseh Cement Silo Company, Tecumseh, Okla., has been incorporated with a capital stock of $18,000 by W. C. Furry, A. C. Neel and M. D. Lewis.

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The Safety First Air Brake Company, Ltd., Victoria, B. C., has been incorporated with a capital stock of $300,000.

The Ellison Milling Company, Ltd., Raymond, Alberta, intends to enlarge its flour mill at Cardston, Alberta. J. E. Ellison, Cardston, is president.

The Usk Lumber Company, Usk, B. C., has been incorporated with a capital stock of $25,000, and plans the establishment of a sawmill.

The Stewart Kennedy Lumber Company, Ltd., Vermillion, Alberta, has been incorporated with a capital stock of $20,000 to manufacture timber, etc.

The Tabre Safety Devise Company, Ltd., Victoria, B. C., has been incorporated with a capital stock of $200,000.

The Ft. Garry Grain Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of $50,000 to operate flour mills, grain elevators, etc.

The Lumber Exporters, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $10,000 to manufacture timber, etc.

The Seafield Lumber & Shingle Company, Ltd., Nanaimo, B. C., has been incorporated with a capital stock of $15,000 to manufacture timber, shingles, etc.

The Saskatoon Children's Carriage Company, Ltd., Saskatoon, Sask., has been incorporated with a capital stock of $20,000.

Government Purchases

WASHINGTON, D. C., December 21, 1914.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, January 12, schedule 7719, for one 3 x 36-in. flat turret lathe, four 16-in. x 6-ft. geared head lathes, two 20-in. x 8-ft. geared head lathes, and one double action toggle press, all for Washington, D. C.; schedule 7720, one left-hand steam hammer for Boston; schedule 7721 for two motor-driven buffing lathes and one pipe cutting and threading machine, all for Charleston, S. C.; schedule 7728 for 15 double-pole hand-operated winches, f.o.b. works; schedule 7737 for miscellaneous expanding mandrels for lathes, for Philadelphia; until January 19, schedule 7745, one motor-driven high-speed drill, for Washington, D. C.; until January 26, schedule 7722, for one angle bar planing machine for Boston.

Sealed proposals will be received by the Bureau of Yards and Docks, Navy Department, Washington, January 9, for one 15-ton locomotive crane for Boston; until 11 a. m., January 23, for two 15-ton locomotive cranes for Pearl Harbor, H. T.

The purchasing officer of the Panama Canal, Washington, will soon invite proposals for a complete pumping plant for dry dock No. 1 at Balboa. It will comprise four main pumps, two drainage pumps, and one bilge or seepage pump. Each main unit is to have an average capacity of not less than 11,000 cu. ft. of sea water per min.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, December 15, for furnishing material and supplies for the navy yards as follows:

Schedule 7604, Ordnance

Class 61, Newport—One motor-driven spur and helical gear shaper—Bid 95, $2247.50.

Schedule 7605, Steam Engineering

Class 72, Brooklyn—One motor-driven lathe, with extra attachments and spare parts—Bid 92, $1073.12; 102, units; 105, $1208.56; 138, $618.40 and $498.50; 173, $713.30 and $802.95; 186, $1050.20; 188, $940.76 and $950; 212, $906.02; 227, $961.

Schedule 7606, Steam Engineering

Class 73, Brooklyn—One universal turret lathe—Bid 138, $1136.50; 173, $1043, $918, and $1010; 188, $970; 212, $993.

Class 74, Brooklyn—One flat turret lathe—Bid 133, $1540; 212, $1580.

Class 75, Brooklyn—Two screw-cutting engine lathes—Bid 92, $400; 188, $835.

Class 77, Brooklyn—Two single-spindle drills—Bid 92, $112; 138, $113.25 and $123; 173, $177 and $137; 188, $130; 312, $189; 258, $250.

The names of the bidders and the numbers under which they are designated in the above list, are as follows:

92, E. L. Fraser; 95, Fellows Gear Shaper Company; 102, Fairbanks Company; 105, Garvin Machine Company; 133, Jones & Lamson Machine Company; 138, Kemp Machinery Company; 173, Manning, Maxwell & Moore; 186, Niles-Bement-Pond Company; 188, D. Nast Machinery Company; 212, Prentiss Tool & Supply Company; 227, Rahn-Larmon Company; 258, Sipp Machine Company.

Trade Publications

Water Tube Boiler.—George T. Ladd Company, 1620 Farmers' Bank Building, Pittsburgh, Pa. Bulletin No. 16. Illustrates and describes the Milne water tube boiler and points out its distinctive features, such as the elimination of scale troubles due to the confining of precipitates in the feed box in the lower drum, simple form of construction, long life of setting and low maintenance cost. Sectional elevations and exterior views of the boiler, showing its construction and method of installation are included.

Steel Hand Trucks.—Edwards Mfg. Company, Cincinnati, Ohio. Folder. Describes a line of all steel trucks for handling heavy freight and for use in factories and warehouses. The use of steel enables the truck to be readily cleaned where that is necessary and the wheels are located underneath the body, so as to permit obstacles to be passed readily.

Calendar.—McClintic-Marshall Company, Pittsburgh, Pa. Wall calendar. Size, 13¾ x 21 in. Each month's leaf bears a calendar for the preceding and following month in addition to the current one. In addition, there is an illustration on each leaf of some contract executed by the company. The hanger itself contains calendars for the years 1915 and 1916.

Aligning Reamer for Bearings.—Harding Distributing Company, 28 School street, Boston, Mass. Pamphlet. Calls attention to a reamer that has been developed for scraping a set of bearings without disturbing the alignment. A number of illustrations of the reamer and the way in which it is employed are included.

Automatic Numbering Machine.—James H. Matthews & Co., Pittsburgh, Pa. Folder. Calls attention to various types of numbering and line dating machines that are made for stamping papers. Illustrations and brief descriptions of the machines are given, together with facsimile reproductions of imprints.

Chain Hoists.—Chisholm-Moore Mfg. Company, Cleveland, Ohio. Pamphlet. Shows some of the ways in which Cyclone hoists are helping manufacturers to lower their costs. The illustrations include a number of special installations, an ammunition hoist used on a battleship and the methods employed by the maker to secure strength and rigidity in hoisting.

Boilers.—International Boiler Works Company, East Stroudsburg, Pa. Desk calendar. Consists of a single leaf, measuring 3¾ x 5½ in., for each day in the year. Practically all the space on each leaf is available for memoranda, the only advertising being the name of the firm and its location, with the day in easily read type below.

Drawn Steel.—Kidd Drawn Steel Company, Aliquippa, Pa. Pamphlet. Gives tables of the various kinds and sizes of drawn steel products of the company. These include drill rods for twist drills, taps and reamers, and small tools and coiled crucible steel wire for needles of all kinds, awls, etc. In the tables the sizes with decimal equivalents of an inch and prices are given. Mention is also made of other lines of the company, such as dental steel and special shapes.

Mechanical Draft.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Folder. Relates to the use of the turbo-undergrate blower as a means for securing additional draft and steam. Mention is also made of other apparatus of the company, such as fuel economizers, dust collecting systems, mechanical stokers, engines, turbines, etc.

Magnetic Switches.—Cutler-Hammer Mfg. Company, Milwaukee, Wis. Booklet. Describes a new line of magnetic switches which includes a new magnetic lockout switch of the series coil-operated type, a redesigned line of shunt coil operated switches and spring closed switches for dynamic braking. The first of these switches is intended for automatic motor starting purposes, and it will remain open when the current is excessive, closing when the amount of current falls below a predetermined value. The redesigned shunt switches are of the clapper type construction, and one of the special advantages claimed for them is that their parts can be interchanged with those of the series coil operated switches of the same capacities. The spring closed switches have the same contacts as the other two and are intended for use in dynamic brake control systems to keep the circuit closed when the controller is in the off position without requiring a switch coil to be energized continuously. Illustrations of the various switches and tables of the sizes in which they are made are employed to supplement the text descriptions.

Dust Collecting System and Sheet Metal Specialties.—Ohio Blower Company, Cleveland, Ohio. Two booklets. One explains the method of installing the company's dust collecting system and shows illustrations of the various parts. The other illustrates a line of sheet metal and angle iron specialties for shops, which includes refuse boxes, stock bins, shop cans, mechanics' chests, racks, angle iron rings and ventilators.